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THE SUBFAMILY LEEUWENHOEKINAE IN THE NEOTROPICS (ACARINA: TROMBICULIDAE)

by

Jack T. Reed
and
James M. Brennan

A LIST OF VENEZUELA CHIGGERS, PARTICULARLY OF SMALL MAMMALIAN HOSTS (ACARINA: TROMBICULIDAE)

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TABLE OF CONTENTS

THE SUBFAMILY LEEUWENHOEKINAE IN THE NEOTROPICS (Acarina: Trombiculidae)

ACKNOWLEDGMENTS 1
ABSTRACT 1
INTRODUCTION 1
SYSTEMATIC SECTION 2
HOST-PARASITE LIST 39
LITERATURE CITED 41

A LIST OF VENEZUELA CHIGGERS, PARTICULARLY OF SMALL MAMMALIAN HOSTS (Acarina: Trombiculidae)

ABSTRACT 45
INTRODUCTION 45
HOST-PARASITE LIST 67
LITERATURE CITED 74

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THE SUBFAMILY LEEUWENHOEKINAE IN THE NEOTROPICS (ACARINA: TROMBICULIDAE)[1]

by

Jack T. Reed[1] and James M. Brennan[2]

ACKNOWLEDGMENTS

We gratefully acknowledge the assistance of personnel from the Field Museum of Natural History, Chicago, for the loan of type specimens. Special thanks are accorded Dr. L. van der Hammen, Rijksmuseum van Natuurlijke Historie, Leiden, the Netherlands, for the loan of the type and only known specimen of *Leeuwenhoekia verduni* Oudemans.

ABSTRACT

Neotropical representatives of the subfamily Leeuwenhoekinae are reviewed. The genus *Odontacarus* comprises 66 percent of the chiggers examined, and 82 percent of this genus were identified as *O. tubercularis* (Brennan). The following genera are redescribed: *Albeckia* Veracammen-Grandjean and Watkins, *Leeuwenhoekia* Oudemans, *Odontacarus* Ewing, *Sasacarus* Brennan and Jones, *Wagenaaria* Brennan, and *Whartonia* Ewing. New taxa are: *Odontacarus comosus comosus, O. c. novemsetus, O. dienteslargus, O. pugnosus, O. schoenesetosus, O. sunnianae, O. tiptoni, O. tuberculohirsutus, O. vanderhammeni, O. vergrandi, Sasacarus furmani panamensis,* and *Whartonia angulascuta. Odontacarus fieldi* Brennan and Jones, 1961, and *O. cayolargoensis* Brennan, 1959, are synonymized under *O. tubercularis* Brennan, 1952. Keys to genera and species are provided.

INTRODUCTION

The larval trombiculid mites of the subfamily Leeuwenhoekinae are parasitic on small mammals, reptiles, amphibians, and occasionally birds. The subfamily is worldwide in distribution. Nine genera and subgenera are endemic to the neotropical region.

Since erection of Leeuwenhoekinae in 1944, revisionary works have been restricted either to discrete geographical areas other than the neotropics or to discussions on the generic level only. A study of more than 15,000 chiggers from Venezuela has emphasized the need for a comprehensive review of the leeuwenhoekinae chigger fauna of the neotropical region.

This paper is based on examination of more than 1,700 larvae, mostly off small mammals. Eight genera and subgenera and 28 species (12 of them new) are represented. Supraspecific taxa are redescribed primarily on the basis of neotropical representatives; and specific redescriptions, with 3 exceptions, are based on type material. Figures are included if illustrations accompanying earlier descriptions are considered inadequate. The genus *Hannemania* Oudemans, 1911, is not discussed.

Measurements, in addition to the standard measurements, include AMA—length of accessory branch on anterosubmedian scutal setae; AMB—the distance between the 2 anterosubmedian scutal setae; the distance between the 2 setae on coxa I; and the total length of the cheliceral blades. The length of the nasus is measured from the point of attachment of the projection to the scutum, and the length of the idiosoma is measured from the posterior margin of the cheliceral bases to the posterior margin of the idiosoma. A genuala formula indicates the number of genualae per genu for legs I, II, and III, respectively (i.e. 2+, 1+, 1). The + indicates presence of a microgenuala. A similar formula is used to indicate the number of tibialae and microtibialae on legs I, II, and III. All measurements are in micrometers.

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SYSTEMATIC SECTION

Subfamily Leeuwenhoekinae Womersley

Leeuwenhoekiinae Womersley, 1944:102 [Type genus: *Leeuwenhoekia* Oudemans, 1912, original designation].

Leeuwenhoekiidae Womersley, 1945:96; Vercammen-Grandjean, 1968:119.

Leeuwenhoekiinac: Wharton, 1947:381; Fuller 1952:227; Vercammen-Grandjean, et al., 1973:60.

Leeuwenhoekinae: Hsu and Wen, 1963:47.

Diagnosis: Larvae lacking palpotarsal subterminala, with 2 anterosubmedian scutal setae, bisetose coxa I, leg segmentation 6-6-6[*], and microgenuala II present.

Redescription: Larvae parasitic on small mammals, reptiles, amphibians, and occasionally birds. Scutum with 2 each, anterosubmedian setae, anterolateral and posterolateral setae; nasus present or absent. Palpotarsus lacking subterminala. Eyes present. Leg segmentation 6-6-6; coxa I bisetose; genu I, II, and III each with 4 branched setae; leg I usually lacking parasubterminala; microgenuala II present. Tracheae and spiracles present or absent.

Key to the Genera

1. Nasus present, spiracles and tracheae present 2
Nasus lacking, spiracles and tracheae present or absent 3

2(1). Cheliceral blades with tricuspid cap only .... *Leeuwenhoekia*
Cheliceral blades with dorsal and/or ventral rows of teeth .... *Odontacarus*

3(1). Tracheae and spiracles absent .... *Wagenaaria*
Tracheae and spiracles present 4

4(3). Cheliceral blades with tricuspid cap only, basal inner margin of palpotibial claw denticulate .... *Sasacarus*
Cheliceral blades with dorsal and/or ventral rows of teeth, palpotibial claw not denticulate at base 5

5(4). Microgenuala and microtibiala stubby or clubbed, cheliceral teeth ventral only .... *Albeckia*
Microgenuala and microtibiala spiniform, cheliceral teeth dorsal and ventral .... *Whartonia*

Remarks: The subfamily was originally erected for *Leeuwenhoekia verduni*, 2 other species placed in that genus by Oudemans (1912), and 5 species placed in the genus by Womersley (1944). Womersley (1945) elevated the subfamily to full familial rank on the basis of tracheae and spiracles and included the type genus and 6 other genera. Familial rank was questioned by Wharton (1947) who considered the group as a trombiculid subfamily only. The group has recently been interpreted by Vercammen-Grandjean, et al. (1973, chart) as a family having over 27 genera and subgenera, including 7 genera containing species identified from areas of the neotropics.

Genus *Leeuwenhoekia* Oudemans

Leeuwenhoekia Oudemans 1910:88 [Type species: *Heterothrombidium verduni* Oudemans, original designation]; Oudemans, 1911:138; Fuller 1952:234; Gould, 1956:14; Vercammen-Grandjean, et al. 1973:61

Diagnosis: Larvae with spiracles and tracheae; nasus present, cheliceral blades with dorsal apical tooth only; subterminala and parasubterminala absent from leg I. *Leeuwenhoekia* can be distinguished from the closely related genus *Comatacarus* Ewing, 1942, primarily by possession of tracheae and spiracles.

Redescription: Larvae neotropical, parasitic on small rodents and marsupials. Cheliceral blades with tricuspid cap only; palpotibial claw 5 pronged; palpal formula variable; galeala branched. Tracheae and spiracles present; scutum with broadly rounded posterior margin, sensillae probably flagelliform. Two genualae I, genuala II and III; 2 tibialae I and II and tibiala III; coxa I bisetose; coxae II and III unisetose; mastisetae lacking; onychotriches present. Dorsal and ventral setae moderately branched; 2 sternals present.

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[*] One North American species of the genus *Comatacarus* has leg segmentation 7-6-6, the femur and telefemur fused.

Key to *Leeuwenhoekia* species

1. Sensillary bases anterior to posterolateral scutal setae, dorsal setae not bilaterally flattened .... *verduni*
2. Sensillary bases posterior to posterolateral scutal setae, dorsal setae bilaterally flattened .... *vercammeni*

Leeuwenhoekia verduni (Oudemans)
(Fig. 1)

Heterothrombidium verduni Oudemans 1910:88. [Holotype, larva; ex *Didelphis opossum*, South Brazil; Rijksmuseum van Natuurlijke Historie, Leiden].

Leeuwenhoekia verduni: Oudemans, 1911:138; Oudemans, 1912:74; Fuller, 1952:236; Brennan and Dalmat, 1960:183; Vercammen-Grandjean, et al., 1973:61.

Diagnosis: *L. verduni* differs from *L. vercammeni* in slender form of, and fewer idiosomal setae, and tuberculate setal bases. Other differences may be noted from the following redescription.

Redescription: Unassisted redescription of the holotype is restricted by its poor state of preservation (see remarks below). Descriptive information from Oudemans (1912) and Fuller (1952) is therefore included and parenthetically identified. *Idiosoma*: Broad ovoid, engorged; length and width 520 and 540; eyes 2/2 in ocular plates, anterior 17, posterior 10 μm in diameter. Body setae generally densely branched with short setules, setal bases tuberculate. DF may be considered 2 (humerals) 4-2-4-4-4-2 or 4-4-4-4-4-2. VF, 2 ventrals, 10-10-2 pre-anals, 2 para-anals, 4 postanals plus 6 similar to dorsals. Spiracles present, tracheae visible to posterior margin of idiosoma. *Gnathosoma*: Palpal formula BBN_bNN (Fuller), palpal claw pentafurcate (Oudemans), or trifurcate (Fuller). Palpotarsus with 5 branched setae, 1 nude seta and tarsala (Oudemans, Fuller). Galeala with 3 branches; cheliceral blades obscured but apparently with minute tricuspid cap. *Scutum*: Shaped as figured by Oudemans (1912, Fig. R-3); sparsely punctate, PL stout but nonclavate; anterior margin relatively straight, posterior margin broadly rounded medially. AW-61, PW-84, SB-38, ASB-ca. 23, PSB-ca. 20, AMB-10, PL-84 (Fuller). *Legs*: Specialized setae as figured; coxal punctae small, sparse; tarsal claws with small barbs; empodium slender, lacking barbs. Leg index 818.

Distribution: Known only by the type specimen, South Brazil; E. A. Göldi, collector.

Specimens Examined: Holotype only.

Other Records: None.

Remarks: The holotype, labeled apparently in Oudemans's handwriting, was observed to be in extremely poor condition, due perhaps to some attempt to remount the specimen. Only 2 legs remain attached to the idiosoma (3 others are widely separated in the medium), the palpi are missing, only 3 dorsal setae remain, and only a partial posterolateral scutal seta remains on an anteriorly tipped scutum. The disputed furcation of the palpotibial claw, pentafurcate (Oudemans 1912:76) vs. trifurcate (Fuller 1952:237) cannot be resolved, nor can the number and kind of palpotarsal setae be verified. Both Oudemans and Fuller reported 5 branched setae and 1 nude seta plus a tarsala on the palpotarsus. Assuming that no nude palpotarsal setae other than the tarsala exist within the subfamily, Vercammen-Grandjean et al. (1973:61) reported 6 branched setae plus a tarsala (Vercammen-Grandjean, 1973, personal correspondence). Since phase contrast microscopy was not available to Fuller or Oudemans, the number of setae on the palpotarsus may be in doubt. The difference in number of these setae reported for *L. verduni* and *L. vercammeni* Brennan and Dalmat (5 branched and 1 nude as opposed to 7 branched) is therefore not considered grounds to place the 2 species in separate genera.

Leeuwenhoekia vercammeni
Brennan and Dalmat
(Fig. 2)

Leeuwenhoekia vercammeni Brennan and Dalmat, 1960:183. [Holotype, larva; ex *Heteromys d. desmarestianus*, Guatemala; Field Museum of Natural History, Chicago].

Diagnosis: *L. vercammeni* is easily distinguished from *L. verduni* by the bilaterally flattened dorsal setae, atuberculate setal bases, and more numerous idiosomal setae.

Redescription: *Idiosoma*: Broad ovoid, engorged. Length and width of holotype 723 and 482. Eyes apparently single, 12 μm in diameter. Body setae somewhat bilaterally flattened, moderately branched, setal bases atuberculate; dorsal setae total about 87. Dorsal formula of paratype approximately 13-12-10-3-12-4-13-10-4-4-2.

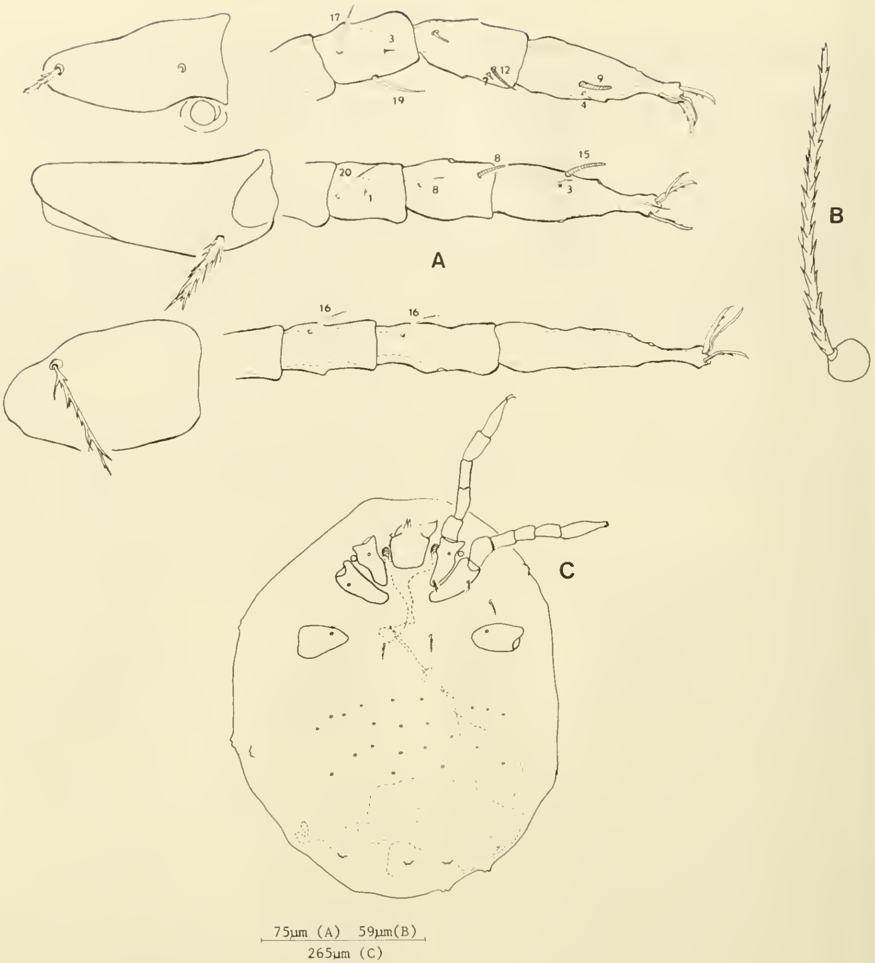

Fig. 1. *Leeuwenhoekia verduni*. A, leg segments showing specialized setae; B, dorsal setae; C, ventral aspect of idiosoma showing condition of holotype.

Ventral formula 2 sternals, 24 pre-anals, 36 post-anals. Spiracles present; portions of tracheae visible to posterior idiosomal margin. *Gnathosoma*: Cheliceral bases moderately punctate, palpal formula B/B/NNB; palpotarsus 7B plus tarsala; galeala basally stout, with long branches; claw long, pentafurcate. Cheliceral blades 39 µm long, apically curved, with minute tricuspid cap. *Scutum*: Shaped as originally figured (Brennan and Dalmat, 1960:184, Fig. 1); AL's and PL's stout, with long apparently caducous setules. Measurements of holotype (measurements of one paratype given in parentheses): AW-98 (100), PW-93 (96), SB-38 (49), ASB-33, PSB-24, AP-27 (31), AM-38 (45), AL– (ca. 56), PL– (58+). *Legs*: Coxae and specialized setae as originally figured. Genuala formula 2+,1+,1. Tibiala formula 2+,2,1. Branched setae per leg segment listed sequentially for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,6,5; genu 5,4,4;

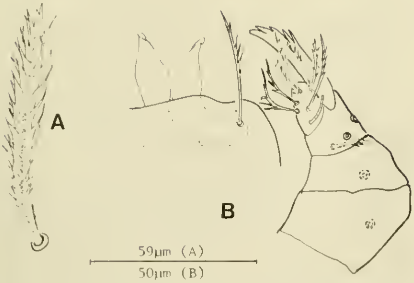

Fig. 2. *Leeuwenhoekia vercammeni* A, dorsal seta; B, palpus and cheliceral blades, ventral aspect.

tibia 8,6,6; tarsur 27,18,17. Leg index (paratype) 885.

Distribution: Known only from the holotype and 2 paratypes, Yepocapa, Dept. Chimaltenango, Guatemala.

Specimens Examined: Holotype and 2 paratypes, ex *Heteromys d. desmarestianus*, Yepocapa, Dept. Chimaltenango, Guatemala, 11 May 1948. Luis de la Torre, collector.

Other Records: None.

Remarks: Although only 3 specimens of the species are available for study, the close relationship of *L. vercammeni* to *L. verduni* is indicated by the form of cheliceral blades, stout scutal setae, and the presence of onychotriches.

Genus *Albeckia* Vercammen-Grandjean and Watkins

Albeckia Vercammen-Grandjean and Watkins, 1966:74 [Type species: *Albeckia albecki* Vercammen-Grandjean and Watkins, by monotype]; Vercammen-Grandjean, et al. 1973:64.

Diagnosis: Leeuwenhoekine larvae lacking nasus; tracheae and spiracles present. Cheliceral teeth ventral only.

Redescription: Palpal tarsus 4B plus tarsala; palpal claw pentafurcate. Tricuspid cap on cheliceral blades with ventral row of teeth. Scutum lacking nasus; anterior margin sinuate, lateral margins concave, posterior margin broadly convex; sensillae flagelliform. Onychotriches present.

Albeckia albecki Vercammen-Grandjean and Watkins

Albeckia albecki Vercammen-Grandjean and Watkins, 1966:74 [Holotype, larva, ex *Antrozous pallidus pacificus*, Solano Co., California; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: See generic diagnosis.

Redescription: (Based on paratype: Holotype data in parentheses from original description): *Idiosoma*: Ovoid. Length and width of paratype 665 and 427. Eyes 2/2 in plates; anterior 15, posterior 14 in diameter. Dorsal setae 43 to 60 µm, anterior rows irregularly placed, arranged approximately: 2 humerals (65 µm)-6-6-6-6-8-10-6-4-2. Setae densely branched, branches long and slender. Two sternals plus 30 slender pre-anals (including first postanals), plus 26 postanals shorter but similar to dorsals. Anus at fifth row of setae. Spiracles large; tracheae visible to posterior third of idiosoma. *Gnathosoma*: Cheliceral bases sparsely punctate. Blades 38-40 µm long with tricuspid cap and row of teeth anteroventrally. Palpal formula B/B/BBB; femoral, genual, and dorsotibial densely branched, ventrotibial and laterotibial sparsely branched, branches long. Tibial claws pentafurcate. Tarsus 4B plus tarsala. Gealeae sparsely branched. *Scutum*: Shaped as originally figured. Anterior margin sinuate, lateral margins concave, posterior margin broadly rounded. Scutal setae similar to dorsals, sensillae flagelliform; apical half sparsely branched, branches long, bases slightly anterior to PL's. Measurements of paratype (measurements of holotype and 9 paratypes in parentheses—from original description) AW-74 (69), PW-85 (80), SB-32 (29), ASB-30 (28), PSB-18 (18), AP-25 (23), AMB-10 (10), AM-49 (44), AL-48 (44), PL-64 (63), S— (66). *Legs*: All leg segments with few punctate. Genuala formula 1+,1+,1; Tibiala formula 2+,2,1; microtibialae and microgenualae stubby. Tarsala I (11 µm), spiniform microtarsala laterad of tarsala; sub- and parasubterminalae absent. Tarsala II (18 µm) plus laterodistal spiniform microtarsala. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 23,17,15. Distance between coxa I setae 34. Leg index 822.

Distribution: Venezuela and California.

Specimens Examined: Holotype and one paratype, ex *Antrozous pallidus pacificus*, Solano Co., California, Jan 1965; 1 larva, ex *Eptesicus montosus*, Venezuela, Distrito Federal, 4 km NNW Caracas (Los Venados), 1,559 m, 25 Jul 1965; and 7, ex *Histiotus* sp. A, Venezuela, Distrito Federal, 5 km NNE Caracas (Pico Avila), 2,101 m, 23 Aug 1965.

Other Records: 38 paratypes, *Antrozous pallidus pacificus*, Solano Co., California, Jan

1965 (Vercammen-Grandjean and Watkins, 1966:77).

Remarks: One paratype examined showed a small angulate projection on the scutum which appears to be a rudimentary nasus. According to Vercammen-Grandjean and Watkins (1966: 76), this occurred on "several specimens in the type series of forty." The scuta of the Venezuela specimens did not possess this projection and were rounded laterally instead of possessing "broadly recessed" lateral margins. In all other respects, the Venezuela specimens compared well with the type material examined.

Genus *Odontacarus* Ewing

Odontacarus Ewing, 1929a:22 [Type species: *Trombicula dentata* Ewing, 1925, original designation]; Brennan 1959: 1; Vercammen-Grandjean, 1968:120; Vercammen-Grandjean, et al. 1973:64.

Acomatacarus Ewing, 1942:490; [Type species: *Acomatacarus arizonensis* Ewing, 1942, original designation]; Ewing, 1946:436; Gould, 1956:21; Brennan, 1959:1; Vercammen-Grandjean 1968:122, Vercammen-Grandjean, et al. 1973:64.

Diagnosis: Differs from other leeuwenhoekine genera by possessing nasus, spiracles, tracheae, and dorsal and ventral rows of teeth on cheliceral blades.

Redescription: Larvae worldwide, parasitic on mammals, reptiles, and birds. Cheliceral blade 30-100 μm long with a row each of dorsal and ventral teeth, or a row of ventral teeth only (subgenus *Tarsalacarus*). Palpotibial claw with 3 to 4 prongs. Palpal formula $B/B/B\frac{NN}{BB}$. Palpal tarsus 7B plus tarsala. Tracheae and spiracles present. Scutum subpentagonal with broadly rounded to bluntly angulate posterior margin. Sensillae flagelliform. Coxa I bisetose, coxa II variable, coxa III unisetose. Mastitarsala III usually present. Genu I, II, and III with 4 branched setae. Femora I, II, and III with 6, 5, and 4 branched setae, respectively.

Key to Subgenera and Species

1. Tarsala III present, cheliceral blades with row of ventral teeth only (subgenus *Tarsalacarus*) 16

Tarsala III lacking, cheliceral blades with dorsal row and ventral row of teeth (subgenus *Odontacarus*) 2

2(1). Distance between anterosubmedian scutal setae bases less than or equal to 11 μm; tarsus I shorter than 75 μm 3

Distance between anterosubmedian scutal setae bases greater than 11 μm; tarsus I longer than or equal to 75 μm 6

3(2). One genuala I; dorsal setae broad, with dorsal and ventral barbs obviously differentiated .... ***sunnianae*** n. sp.

Two genualae I; dorsal setae not broader than thick 4

4(3). Sensillae with long branches apically 5

Sensillae with short barbs, full length .... ***tubercularis***

5(4). Host, lizards; onychotriches present; legs slender; dorsal setae slender with oppressed barbs .... ***australis***

Host, rodents and lagomorphs; onychotriches lacking; legs not slender; dorsal setae with stout, obvious barbs .... ***mastigophorus***

6(2). Cheliceral blades longer than 65 μm 7

Cheliceral blades shorter than 65 μm 9

7(6). About 80 dorsal setae, stout with stout branches; posteromedian dorsal setae short, sparsely barbed; posterolateral scutal setae > anterolateral scutal setae > anterosubmedian scutal setae .... ***munchiquensis***

About 100 to 200 dorsal setae; relatively slender, posteromedian dorsal setae similar to lateral setae 8

8(7). Nine branched setae on tibia I, 33 branched setae on tarsus I; sensillar bases considerably posterior to bases of posterolateral scutal setae .... ***schoenesetosus*** n. sp.

Eight branched setae on tibia I, 23 branched setae on tarsus I; sensillar bases slightly posterior to bases of posterolateral scutal setae .... *dienteslargus* n. sp.

9(6). Genuala II and III present .... *kofordi*
Genuala II and III lacking 10

10(9). Accessory branch on anterosubmedian scutal setae shorter than 20μm; distance between anterosubmedian scutal setae less than 16 μm 11
Accessory branch on anterosubmedian scutal setae longer than 20 μm; distance between anterosubmedian scutal setae more than 16 μm 14

11(10). Branched tibial setae for legs I, II, and III 9, 7, 7 12
Branched tibial setae for legs I, II, and III 8, 6, 6, or 9, 6, 6 13

12(11). Coxa II bisetose; about 60 slender ventral setae (pre-anals) .... *tiptoni* n. sp.
Coxa II unisetose; about 36 slender ventral setae (pre-anals) .... *vergrandi* n. sp.

13(11). Tibia I with 8 branched setae .... *comosus comosus* n. ssp.
Tibia I with 9 branched setae .... *comosus novemsetus* n. ssp.

14(10). About 130 ventral setae; anterosubmedian scutal setae much shorter than anterolateral scutal setae 15
About 70 ventral setae; anterosubmedian and anterolateral scutal setae subequal .... *vanderhammeni* n. sp.

15(14). Nasus nearly as broad as long; dorsal setae with short appressed setules ... *pugnosus* n. sp.
Nasus considerably longer than broad; dorsal setae with long, flexible setules .... *tuberculohirsutus* n. sp.

16(1). Palpal and dorsal setae heavily branched .... *bakeri*
Palpal and dorsal setae sparsely branched .... *chiapanensis*

Subgenus *Odontacarus* (Ewing)

Odontacarus Ewing, 1929b:22 [Type species: *Trombicula dentata* Ewing]. Brennan, 1959: 1; Vercammen-Grandjean 1968:120.

Diagnosis: Larvae with dorsal and ventral rows of teeth on cheliceral blades; genuala III lacking; palpotibial claw trifurcate.

Redescription: Larvae of medium to large size. Cheliceral blades 30-100 μm long with dorsal and ventral rows of teeth. Palpotibial claws trifurcate. Palpal formula variable, $B/B/B\frac{NN}{BB}$. Flagellum usually with small barbs. Tarsala III lacking. Mastitarsala present, usually barbed. Dorsal setae usually with 4 rows of branches.

Odontacarus (*O.*) *australis* (Ewing)
(Fig. 3)

Trombicula australis Ewing, 1929b:10 [Holotype, larva; ex *Tropiduras peruvianus*, Lima, Peru: Rocky Mountain Laboratory, Hamilton, Montana];

Odontacarus australis Ewing, 1931:6; Brennan, 1959:2; Brennan and Jones, 1961a:176.

Diagnosis: Differs from other members of the genus by the asymmetrically branched sensillae, length and form of idiosomal setae, length and slenderness of the legs, and onychotriches.

Redescription (Based on holotype. Data from Venezuela specimen parenthetically included): *Idiosoma*: Ovoid. Length and width of holotype, 538 and 314. Eyes 2/2 in plates; anterior 13, posterior 12 μm in diameter. Dorsal setae 34-44 μm (26-38 μm) tapering basally, setules delicate; arranged approximately: 2 (humerals, 59 μm)-8-5-7-8-10 plus 12 posterior setae and 5 lateral setae per side, not continuous with dorsal rows. Lateral setae longest, middorsals shortest. Two sternals plus 50 ventrals, 32-39 μm, longer posterolaterally; pre-anals and first postanal row with longer setules. Posterior ventrals similar to dorsals. Anus at fourth row of ventral setae. Spiracles large, adjacent to anterior margin of coxa I. Tracheae broad, visible to posterior margin of idiosoma. *Gnathosoma*: Cheliceral bases moderately punctate, posterior punctae larger. Blades narrow, 47 μm long, curved apically with 5 dorsal and 3 or more ven-

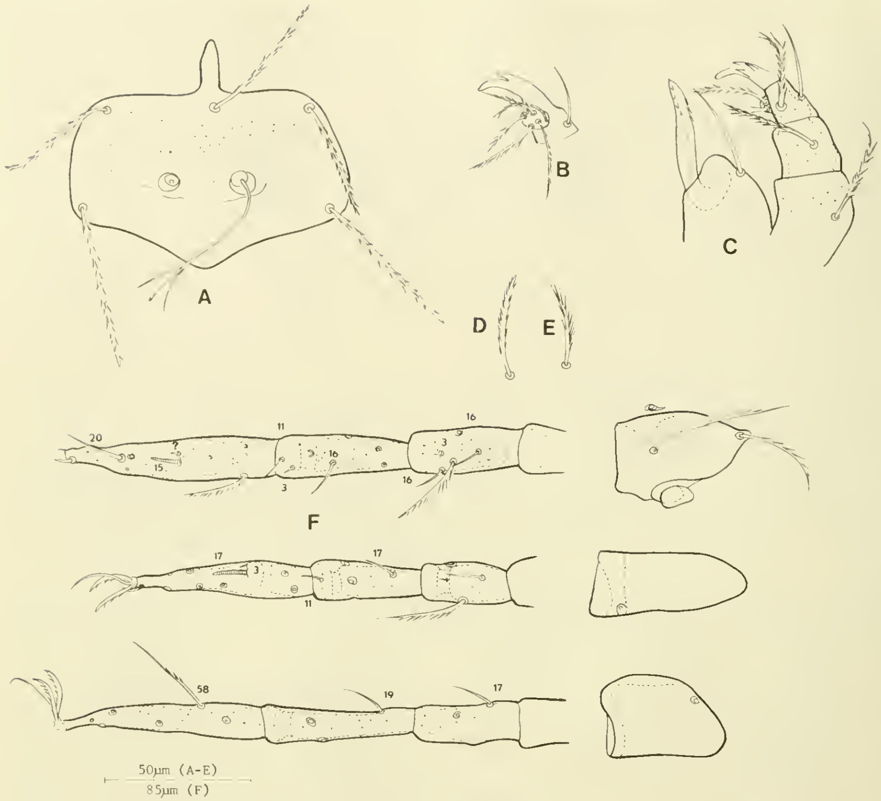

Fig. 3. *Odontacarus australis* A, scutum of holotype; B, palpal tibia and tarsus; C, palpus and cheliceral blade, dorsal aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

tral teeth. Palpal formula B/B/B?, femoral, genual, and dorsotibial setae moderately branched. Palpotibial claw of holotype obscured (claw of Venezuela specimens quadrifurcate with one large prong). Palpotarsal setae sparsely branched. Galeala with few barbs. *Scutum*: Shaped as figured. Moderately, faintly punctate medially. Anterior margin slightly sinuate; posterior margin angulate. Scutal setae moderately branched, similar to dorsals. Sensillae flagelliform with long branches, bases anterior to PL's. Measurements of holotype: AW-73 (76), PW-90 (87), SB-24 (24), ASB-34 (30-33), PSB-31 (25-27), AP-37 (30), AMB-? (10), AM-52 (42), AL-42 (35), PL-59 (54), S-50+ (60). Nasus 8 x 19 (8 x 19). *Legs*: Coxae moderately to densely punctate; leg segments sparsely punctate, punctae large. Distance between coxae I setae 49 μm. Legs long and slender; tarsal claws with onychotriches, empodia possibly with few. Specialized setae as figured. Branched setae per leg segment for legs 1, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4: genu 4,4,4; tibia 8,6,6; tarsus ?,17,15. Mastitarsala III barbed. Leg index 1130.

Distribution: Peru, Lima, and Venezuela, Zulia district.

Specimens Examined: Holotype, ex *Tropiduras peruvianus*, Lima, Peru, Apr 1928, and 12 larvae, ex 5 unidentified lizards, Venezuela Zulia, 34 km NNE Paraguaipoa (Cojoro), 15 m, 19 Jun 1968.

Other Material: None.

Remarks: Although Brennan (1959), described the palpal claw as trifurcate, Venezuela specimens clearly show 1 large and 3 smaller prongs.

Odontacarus (*O.*) *kofordi* Brennan and Jones

Odontacarus kofordi Brennan and Jones, 1961a: 175 [Holotype, larva; ex *Chinchillula sahamae*, Puno, Peru; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: Differs from *O. tubercularis* and other species with tuberculate setal bases primarily by the form and number of idiosomal setae and the subequal anterior and posterior eyes.

Redescription: *Idiosoma*: Ovoid. Length and width of holotype: 576 and 316. Eyes 2/2, in plates, subequal, about 15 μm in diameter. Dorsal and ventral setal bases tuberculate; setae 32-58 μm, longer anterolaterally. Setae thick with stout setules, as figured. Total dorsal setae about 90, in uneven rows; humerals 62 μm long. Two sternals and 38 slender pre-anals and postanals, plus about 20 posteriorly similar to dorsals. Anus at third row of ventrals. Spiracles large, adjacent to anterodistal margin of Coxa I. Tracheae visible to posterior margin of idiosoma. *Gnathosoma*: Cheliceral bases densely punctate. Blades 44 μm long, with 5-6 small teeth dorsally and 5-6 irregularly spaced ventrally. Palpal formula B/B/BBB; femoral, genual, and dorsotibial setae densely branched, latero- and ventrotibial with about 6 branches. Palpal tarsala 12 μm; branched tarsal setae long with long setules. Palpotibial claw trifurcate, axial prong largest. Galeala with few barbs. *Scutum*: Shaped as originally figured, anterior margin nearly straight, posterior margin bluntly angulate. Scutal setae similar to dorsals. Sensillae sparsely barbed full length; bases slightly anterior to PL's. Measurements of holotype: AS-80, PW-113, SB-28, ASB-38, PSB-29, AP-33, AMB-13, AM-55, AL-56, PL-60, S-85. Nasus 12 x 26. *Legs*: Coxa I moderately punctate, coxa II densely punctate, coxa III moderately to densely punctate, other leg segments sparsely punctate. Distance between coxa I setae 47. Parasubterminala I lacking. Femur I and II, genu III and tibia III with 1 or 2 long, plumose setae. Specialized setae as originally figured. Genuala formula 2+,1,1; tibiala formula 2+,2,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 22,17, 15. Leg index 970.

Distribution: Puno, Peru.

Specimens Examined: Holotype and 1 paratype, ex *Chinchillula sahamae*, Puno, Peru, May 1951.

Other Material: 14 paratypes ex *Chinchillula sahamae, Abrocoma cinerea, Punomys lemminus,* and *Neotomys ebriosus*, Puno, Peru, May 1951 (Brennan and Jones, 1961a:175).

Odontacarus (*O.*) *mastigophorus* Brennan and Dalmat

Odontacarus mastigophorus Brennan and Dalmat, 1960:184 [Holotype, larva; unidentified bird, Acatenango, Guatemala; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: Separates from other *Odontacarus* ssp. by possessing a mastitibiala III and by the differentiated dorsal and ventral setules of the dorsal setae.

Redescription: *Idiosoma*: *Ovoid*. Length and width of holotype 189 and 163. Eyes 2/2 in plates, anterior 10, posterior 7 μm in diameter. Setal bases normal. Dorsal setae with 2 rows of broad setules dorsally and 2 rows of widely spaced thornlike setules ventrally; 25 to 33 μm long, longer posterolaterally; humerals 38; arranged approximately 2 (humerals)-8-6-6-10-10-8 +6 posterior setae and 4 anterolateral setae not continuous with dorsal rows. Two sternals, 22 slender pre-anals, (26-29 μm) and 6 postanals similar to dorsals. Anus at third row of ventral setae. Spiracles prominent, adjacent to anterodistal margin of coxa I. Trachea visible to coxa III region (variable among specimens examined). *Gnathosoma*: Cheliceral bases moderately punctate. Blades 36 μm long with 5 dorsal teeth and a few small ventral teeth. Palpal formula B/B/BBB, all setae sparsely branched. Palpal tarsalae 6 μm; tarsi with at least 5 long, sparsely branched setae. Tibial claws trifurcate, axial prong longest. Galealae with several barbs. *Scutum*: Shaped as originally figured, with slightly sinuate anterior margin and broadly rounded posterior margin; lightly punctate medially. Scutal setae uniformly branched. Sensillae with long branches apically; bases even with or slightly posterior to PL's. Measurements of holotype: AW-58, PW-71, SB-21, ASB-26, PSB-22, AP-21 to 23, AMB-8, AM-25, AL-32, PL-36, S-51. Nasus 6 x 15. *Legs*: Coxae apparently apunctate, other leg segments sparsely punctate. Distance between coxa I setae 32. Specialized setae as originally figured. Parasubterminala I lacking. Genuala formula 1+,0+,0. Tibiala formula 2+,2,0. Microsetae on genu and tibia stubby. Mastitibialae and mastitarsalae III with 1 or 2 barbs. Branched setae per leg segment for legs I, II, and III:

Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,5; tarsus 20,16,13. Claws with pair of onychotriches per claw, empodium nude.

Distribution: Guatemala: Finca Armenia, Aldea Los Plantes and Acatenango, Dept. Chimaltenango.

Specimens Examined: Holotype and 1 paratype, ex bird, Dept. Chimaltenango, Mar 1951; 4 paratypes ex *Sylvilagus floridanus chiapensis*, Chimaltenango, Feb 1951.

Other Material: Two paratypes and 23 specimens, ex *Sylvilagus floridanus chiapensis*, and 1 ex unidentified wood rat, Dept. Chimaltenango, Guatemala.

Remarks: The original description lists 5 branched setae on the palpotarsus. The genus typically has 7. Since none of the 6 specimens observed showed the tarsus clearly, assignment of the species to the genus is not questioned. The difference in the dorsal and ventral setules of the dorsal setae is obvious and diagnostic.

Odontacarus (*O.*) *munchiquensis* Brennan

Odontacarus (*O.*) *munchiquensis* Brennan, 1968: 679 [Holotype, larva; ex *Oryzomys albigularis*, Dept. Cauca, Colombia; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: Differs from *O. tuberculohirsutus* n. sp. and other hirsute, tuberculate *Odontacarus* species primarily by the stout, sparsely branched posteromedian body setae.

Redescription: *Idiosoma*: Broad ovoid. Length and width of holotype: 490 and 407 (idiosoma split—hence measurements inaccurate). Eyes 2/2 in plates; anterior 14, posterior 11 μm in diameter. Setal bases tuberculate. About 90 dorsal setae in uneven rows, 49-102 μm, longer laterally; becoming stouter and with thicker branches posteromedially. Venter with 2 sternals, 44 slender pre-anals, 38-58 μm, plus 28 stout posterior setae similar to dorsals. Spiracle prominent, adjacent to anterior margin of Coxa I. Tracheae traceable to area of Coxa III. *Gnathosoma*: Cheliceral bases densely punctate. Blades 70 μm long with 8 teeth in dorsal row and about 19 in ventral row. Palpal formula B/B/BBB, latero- and ventrotibial setae with few branches, others moderately branched. Palpotarsal setae long, sparsely to moderately branched; tarsalae 13-15 μm long. Tibial claws trifurcate, axial prong largest. Galeala with 1 or 2 barbs (broken on holotype). *Scutum*: Moderately punctate, punctae large. Shaped as originally figured; anterior margin mildly sinuate, posterior margin bluntly angulate. Scutal setae similar to dorsals. AM's apparently lacking accessory branch. Sensillae delicately barbed entire length; bases posterior to PL's. Measurements of holotype: AW-93, PW-116, SB-38, ASB-40, PSB-25, AP-30, AMB-15, AM-64, AL-76, PL-99, S-108. Nasus 12 x 19 (basally). *Legs*: All leg segments moderately punctate. Distance between coxa I setae, 41. Parasubterminala I absent. Specialized setae as originally figured. Genuala formula 2+,0+,0; tibiala formula 2+, 2,1. Microsetae spineform. Branched setae densely branched or plumose. Mastitarsala III barbed, broken on holotype. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 27,17,14. Leg index 980.

Distribution: Colombia, Dept. Cuaca.

Material Examined: Holotype, ex, *Oryzomys albigularis*, Pena del Perro, Dept. Cuaca, Colombia, May 1967.

Other Material: 10 paratypes, ex 4 *Thomasomys cinereiventer*, same area as holotype.

Remarks: The stubs of mastisetae on tarsi III are evident on the holotype, and one is long enough to show a few indistinct barbs. The original description listed mastitarsala III as absent. The galeala, although appearing nude, shows nubbins which indicate broken setules.

Odontacarus (*O.*) *tubercularis* (Brennan)

Acomatacarus tubercularis Brennan, 1952:145 [Holotype, larva; ex *Heteromys anomalus anomalus*, Aragua, Venezuela; Rocky Mountain Laboratory, Hamilton, Montana].

Odontacarus tubercularis: Brennan and Jones, 1960:496; Brennan, 1967: 153; Brennan, 1970: 34; Brennan and Lukoschus, 1971:44.

Odontacarus fieldi Brennan and Jones, 1961: 105, New Synonomy: [Holotype, larva; ex *Zygodontomys cherriei*, [=*Z. brevicauda*] Fort Kobbe, Canal Zone; Rocky Mountain Laboratory, Hamilton, Montana]. Brennan and Yunker, 1966:224.

Odontacarus cayolargoensis Brennan, 1959:2, New Synonomy: [Holotype, larva, ex *Sigmodon hispidus*, Key Largo, Florida; Rocky Mountain Laboratory, Hamilton, Montana]. Brennan and Jones, 1961b:105; Loomis and Crossley, 1963:381; Loomis, 1969:5.

Diagnosis: *Odontacarus tubercularis* differs from all other neotropical species of the nominate subgenus by the following combinations of characters. Distance between coxa I setae less than

40, AMB ≦ 10, 2 genualae I, sensillae with short barbs along entire length.

Redescription: *Idiosoma*: Ellipsoidal. Length and width of holotype (unengorged): 192 and 162. Eyes 2/2 in plates; anterior 12, posterior 10 μm in diameter (paratype). All setae with tuberculate bases. Dorsal setae 40-77 μm, longer laterally and posteriorly; with 4 rows of barbs, (fewer barbs ventrally on inner curve of seta). Venter with 2 sternals, approximately 24 slender pre-anals 24-28 μm long, plus about 12 postanals similar to dorsals. Spiracles at anterior margin of coxae I. Tracheae not visible in holotype, but visible in some specimens to posterior margin of idiosoma. *Gnathosoma*: Cheliceral bases moderately punctate. Blades 43-47 μm long, with 6-8 dorsal and about 7 ventral teeth, widely spaced. Palpal formula B/B/BNN; branched setae sparsely barbed, ventrotibial and laterotibial occasionally barbed. Tarsalae 11 μm. Branched tarsal setae sparsely branched. Tibial claws trifurcate, axial prong largest. Galealae with few barbs. *Scutum*: Shaped as originally figured, posterior margin broadly rounded. Punctae moderate. Scutal setae similar to dorsals. Sensillae sparsely barbed full length, bases slightly posterior to PL's. Measurements of holotype: AW-62, PW-81, SB-29, ASB-30, PSB-23, AP-24, AMB-11, AM-51, AL-50, PL-72, S-90. Nasus 10 x 19. *Legs*: Coxae sparsely, finely punctate. Leg segments sparsely punctate. Specialized setae variable, similar to those figured for *O. cayolargoensis*, (Brennan, 1959:3, Fig. 1); genuala formula 2+,1,1; 2+,1+,0; or 2+,0+,0; tibiala formula 2+,2,1. Branched setae plumose, less densely branched on distal leg segments. Distance between coxa I setae 36-37 μm. Parasubterminala I lacking. Branched setae per segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus ?,17,14 (23,17,14 on other Venezuela specimens). Leg index (paratype) 710.

Distribution: United States (Florida and Texas), Panamá, Surinam, Trinidad, and Venezuela.

Material Examined: Holotype and 3 paratypes, ex *Heteromys anomalus anomalus*, Aragua, Venezuela, summer 1950; plus more than 1,200 larvae from Venezuela with the following frequency of infected hosts: 37, ex 4 *Monodelphis brevicaudata;* 1, ex 1 *Marmosa* sp. A; 81, ex 13 *M. fuscata;* 52, ex 13 *M. robinsoni;* 42, ex 10 *Didelphis marsupialis;* 1, ex *Saccopteryx bilineata;* 1, ex *Micronycteris microtis;* 5, ex *Carollia brevicauda;* 3, ex 1 *Vampyrops helleri;* 8, ex 1 *Vampyressa pusilla;* 1 ex *Sylvilagus floridanus;* 6, ex 1 *Sciurus granatensis;* 285, ex 40 *Heteromys anomalus;* 207, ex 40 *Oryzomys albigularis;* 3, ex 3 *O. concolor;* 1 ex *O. fulvescens;* 2, ex 2 *O. minutus;* 3; ex 1 *Nectomys alfari;* 1, ex *Thomasomys lugens;* 14, ex 3 *Akodon urichi;* 36, ex 8 *Zygondontomys brevicauda;* 114, ex 28 *Sigmodon hispidus;* 46, ex 9 *Sigmomys alstoni;* 1, ex *Rattus norvegicus;* 9, ex 1 *R. rattus;* 29, ex 3 *Agouti paca;* 2, ex 2 *Dasyprocta aguti;* 77, ex 22 *Proechimys semispinosus;* 3, ex 1 *Mazama americana.*

Above collections were made during 1965-1968, in every month except September, from nearly every Venezuelan state. Other material examined includes 89 specimens from the following locations and hosts. UNITED STATES OF AMERICA: 6, ex *Liomys irroratus*, Brownsville, and Cameron Co., Texas, Oct 1960, and Nov 1962; 8, ex *Sigmodon hispidus*, Monroe Co., Florida, Jan 1945. PANAMÁ: 2 larvae, ex *Didelphis marsupialis;* 4, ex 2 *Liomys adspersus;* 1, ex *Zygodontomys brevicauda;* 21, ex 17 *Sigmodon hispidus;* 1, ex *Proechimys semispinosus;* 1, ex *Felis pardalis;* 3, ex *Neomorphus geoffroyi salvini;* 2, ex *Odontophorus erythorops;* collected from Canal Zone, Bocas del Isla, Darién, and Cerro Campana, Dec 1960; Feb, Mar, Sep, and Oct 1961 and Feb 1962. SURINAM: 5 larvae, ex *Proechimys guyannensis*, Uitkyjk; 4 ex *Dasyprocta* sp., "Surinam" 1961 and Jan 1970. TRINIDAD: 6 larvae, ex *Rattus* sp.; 1, ex *Proechimys guyannensis*, 1, ex *D. aguti*; Cumaca and Aripa Cave, May 1954, Apr 1960, and May 1965.

Other Records: *Neomorphus geoffroyi salvini, Odontophorus erythrops, Didelphis marsupialis, Proechimys semispinosus, Liomys adspersus, Sciurus granatensis, Sigmodon hispidus, Zygodontomys microtinus*, and *Felis pardalis* from Canal Zone, Darien, Panamá, (Brennan and Yunker 1966:224); *Zygodontomys cherriei*, and *Sigmodon hispidus*, Canal Zone (Brennan and Jones 1961:105); *Proechimys guyannensis* and *Nectomys squamipes*, Cumaca, Trinidad (Brennan and Jones, 1960:496); *Philander opossum, Nectomys squamipes melanius*, and *Proechimys guyannensis*, Coronie, Surinam (Brennan and Lukoschus 1971:44); *Sigmodon hispidus*, Key Largo, Florida (Brennan, 1959); *Liomys irroratus, Peromyscus leucopus*, and *Sigmodon hispidus*, Cameron Co., Texas (Loomis and Crossley, 1963); *Heteromys gaumeri, Ototylomys phyllotis, Peromyscus yucatanicus*, and *Sigmodon hispidus*, Campeche and Yucatán, México (Loomis, 1969).

Remarks: *Odontacarus fieldi* and *O. cayolargoensis* were originally separated on the basis of the genuala configuration of legs I and II. Examination of 56 specimens from Panamá, topotypes for *O. fieldi*, showed only 16 (29 percent) with a typical *O. fieldi* configuration of 2-0-0 genualae on legs I, II, and III, respectively. Twenty-three specimens (41 percent) lacked a genuala II on 1 leg and 7 specimens possessed genualae II on both legs. In addition, 8 specimens had both genualae II and III, and 2 possessed both genualae III but lacked 1 of the genualae II. Comparison of the holotypes of *O. fieldi* and *O. cayolargoensis* with the comparison microscope showed setae and scutal characteristics to be identical, with slight differences in the thickness of the dorsal setae.

The synonymy of *O. tubercularis* to *O. cayolargoensis* and *O. fieldi* was suspected when approximately 160 specimens from Venezuela could not be assigned with certainty to any one of the 3 species. Two hundred eighty-five specimens were found to possess both genualae II and III, and over 900 specimens lacked genuala III, including 3 specimens which lacked genuala III on one side only. Three specimens lacked both genualae II and III.

Other characteristics differed considerably. The length of setae, as indicated by the length of the posterolateral scutal setae, varied from 55 to 68 µm for those with genualae III, and from 60 to 88 µm for those lacking genuala III. Numbers of idiosomal setae differed slightly as indicated by a variation of 22 to 34 pre-anal setae. Stoutness of idiosomal setae was as variable as their length. No correlation was determined from distributional, host, or seasonal data.

Odontacarus (*O.*) *comosus comosus* n. ssp.

(Fig. 4)

Type Data: Holotype and 3 paratypes, RML #53639 ex *Thomasomys hylophilus*, Venezuela, Táchira, 41 km SSW San Cristóbal (Buena Vista), 2,350 m, 23 Mar 1968; other paratypes. One larva each, RML#'s 52993, 55977, 55983, and 56007; 2 each, RML#'s 52962, 53629, 53642, and 56006; 3 each, RML#'s 52963, 52964, 53659, 53664, and 55930 ex *T. hylophilus*, Venezuela, Táchira, 41 km SW San Cristóbal, (Buena Vista), 2,350 to 2,420 m, 5-27 Mar 1968. N. E. Peterson, F. Brown, and J. Matson, collectors.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Differs from closely related *O. munchiquensis*, Brennan, by the undifferentiated posterior setae, shorter cheliceral blades, and scutal shape.

Description: *Idiosoma*: Broad ovoid. Length and width of holotype (unengorged) 283 and 228. Eyes 2/2 in plates. Anterior 15, posterior 14 µm in diameter. Dorsal and ventral setal bases tuberculate. Dorsal setae 45-101 µm, with 4 rows of setules; arranged approximately: 2 humerals (93 µm)-13-10-9-8-8 + 14 posterior and 8 long lateral setae not continuous with dorsal rows. Dorsal setae 45-101 µm, longer laterally and posteriorly. Venter with 2 sternals and 50 slender, long branched pre-anals and para-anals in uneven rows, 1 pair of slender postanals, plus 10 posterior setae similar to dorsals. Anus at fourth row of ventral setae. Spiracles very large, adjacent to anterior margin of coxa I. Tracheae visible to posterior margin of idiosoma. *Gnathosoma*: Cheliceral bases moderately punctate. Blades 43-54 µm long, with 5 to 6 dorsal teeth and about 8 ventral teeth. Palpal formula B/B/B/BB; genual and femoral setae moderately barbed, dorsotibial densely barbed. Laterotibial setae usually with 1 barb, ventrotibial with 3 to 6. Palpal tarsalae 13 µm; branched tarsal setae long, moderately branched. Tibial claws trifurcate, axial prong largest. Galealae sparsely barbed. *Scutum*: Moderately punctate. Shaped as figured, with posterior margin broadly rounded to bluntly angulate. AM's with accessory branch, AL's apparently with 2 rows of setules, other setae similar to dorsals. Sensillae sparsely barbed, bases slightly posterior to PL's. Measurements of holotype: AW-80, PW-111, SB-34, ASB-41, PSB-23, AP-32, AMB-13, AM-60, AMA-12, AL-73, PL-85, S-101+. Nasus 12 x 23. *Legs*: Coxae II and III, densely punctate, coxa I moderately punctate, leg segments moderately punctate. Distance between coxa I setae 47. Parasubterminala I lacking, mastitarsala on leg III barbed. Specialized setae as figured. Branched setae plumose; Femur I and II with moderately long plumose setae. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 5,5,4; genu 4,4,4; tibia 8,6,6; tarsala 29-30,18,15. Leg index 900.

Distribution: Venezuela, Táchira state.

Specimens Examined: Types plus: One larva ex *Marmosa dryas*, 1, ex *M. impavida*, 1, ex *Oryzomys albigularis*, 2, ex *O. minutus*, 2, ex *Rhipidomys venustus*, and 2, ex unidentified bird, Venezuela, Táchira, 52 km SSW San Cristóbal (Buena Vista), 2,370-2,420 m, 23-29 Mar 1968.

Remarks: Variation was noted in the number of dorsal setae, which varied from 60-70; length of scutal setae; and the number of barbs on the ventrotibial and laterotibial palpal setae. The name was derived from the Latin *comosus*, long hair, referring to the long dorsal setae.

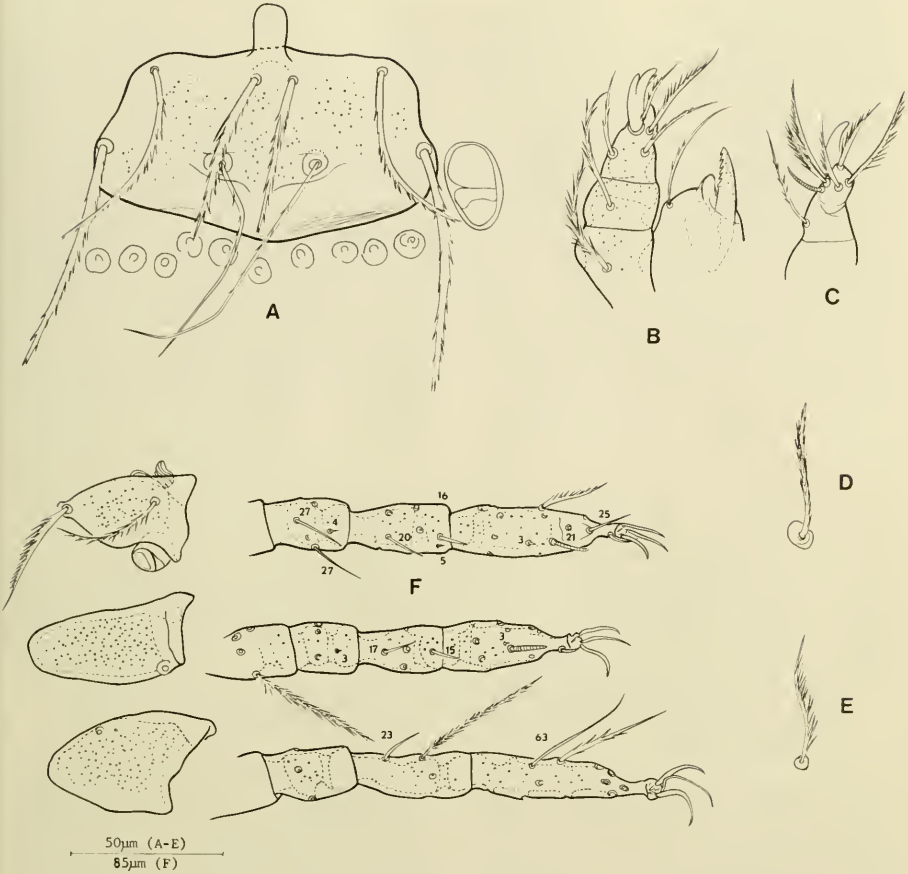

Fig. 4. *Odontacarus comosus comosus,* new subspecies. A, scutum; B, palpus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

Odontacarus (*O.*) *comosus novemsetus* n. ssp. (Fig. 5)

Type Data: Holotype and 3 paratypes, RML #48752, ex *Oryzomys albigularis,* Venezuela, Miranda, 5 km NNE Caracas (Pico Avila), 2,172 m, 28 Aug 1965. Other paratypes: 1 larva, RML #48889, ex *Marmosa fuscata* Venezuela, Distrito Federal, 31 km WSW Caracas, 1,780 m, 21 Dec 1965; 1, RML#48746, ex *Heteromys anomalus* and 1 each, RML#48715 and 48748; 2 each, RML#48729 and 48762, and 3, RML#48753, ex *O. albigularis,* Venezuela, Miranda, 5 km NNE Caracas (Pico Avila), 2,124-2,172 m, 25 Aug-Nov 1965; 2, RML#48888, ex *O. albigularis,* Venezuela, Miranda, 31 km WSW Caracas (Alto Ño Leon), 1,950 m, 20 Dec 1965. N. E. Peterson, collector.

Holotype and Paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Differs from the nominate subspecies primarily by having 9 branched setae on tibia I and 6 on tibia II and III.

Description: *Idiosoma*: Broad ovoid. Length and width of holotype (unengorged) 288 and

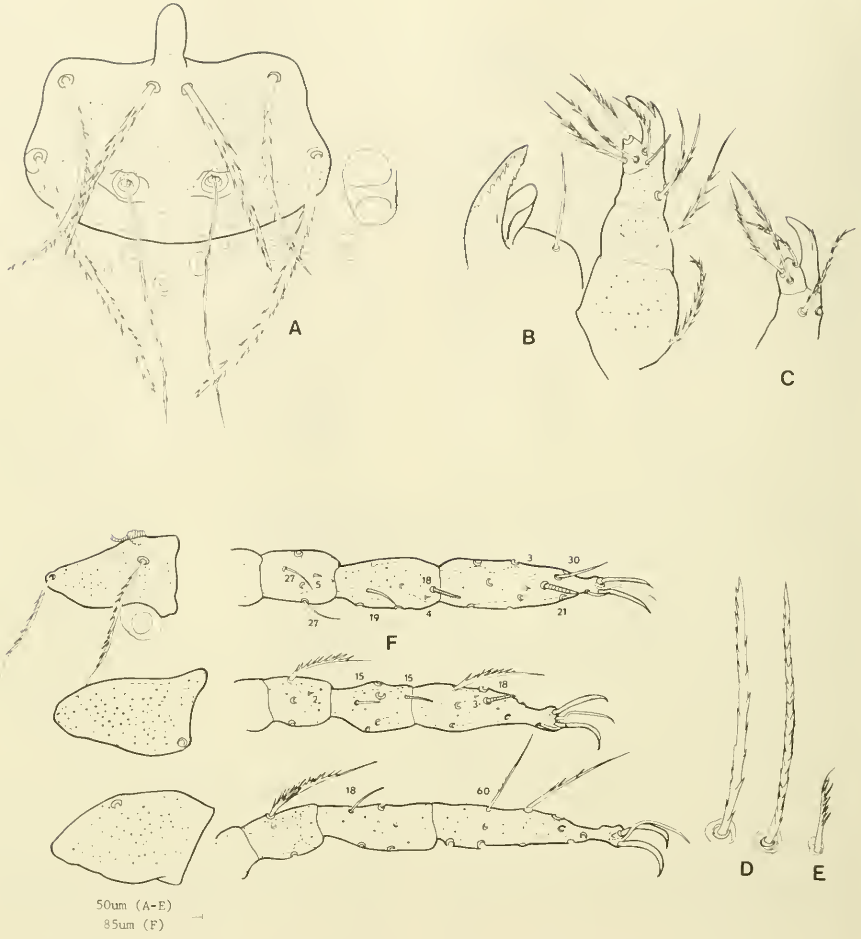

Fig. 5. *Odontacarus comosus novemsetus*, new subspecies. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal tarsus and tibia, dorsal aspect; D, anterolateral dorsal seta—left, ventral aspect, right, dorsal aspect; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

230. Eyes 2/2 in plates, anterior 14, posterior 13 µm in diameter. Dorsal and ventral setal bases large tuberculate. Dorsal setae 55-91 µm, with 4 rows of setules: arranged approximately: 2 humerals (86 µm)-10-9-8-8-8+16 posterior and 10 long lateral setae not continuous with dorsal rows, longer laterally and posteriorly. Venter with 2 sternals and 50 slender, long-branched pre-anals and para-anals in uneven rows; 1 pair of slender postanals and 6-10 posterior setae similar to dorsals. Anus at fourth row of ventral setae. Spiraeles very large, adjacent to anterior margin of coxa I. Tracheae convolutant, visible to posterior margin of idiosoma. *Gnathosoma*: Cheliceral bases punctate. Blades 53 µm long, with 6 dorsal teeth and 9-10 ventral teeth. Palpal formula B B/BBB; genual, femoral, and dorsotibial setae moderately branched, branches short; laterotibial setae nude or with 1-2 barbs. Ventrotibial with 3-4 barbs.

Palpal tarsalae 13 μm; branched setae long, moderately branched, with long setules. Tibial claws trifurcate; axial prong largest. Galealae with few barbs. *Scutum*: Moderately punctate. Shaped as figured. Accessory branch on AM short; other setae similar to dorsals. Sensillae sparsely barbed; bases slightly posterior to PL's. Measurements of holotype: AW-77, PW-101, SB-33, ASB-46, PSB-23, AP-31, AMB-12, AM-72, AMA-7, AL-75, PL-96, S-106. Nasus 12 x 25. *Legs*: Coxae densely punctate, leg segments moderately punctate. Distance between coxa I setae 48. Parasubterminala I lacking; mastitarsala III barbed. Branched setae plumose. Femur I and II, genu and tibia III with moderately long plumose setae as figured. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6; tarsus 27,16,15. Leg index 1070.

Distribution: Venezuela, Distrito Federal and Miranda.

Specimens Examined: Type specimens.

Remarks: Variations were less obvious in *O. c. novemsetus* than in the nominate subspecies. The variational overlap noticed in the diagnostic characters separating the 2 subspecies was the presence of 7 branched tibial setae on 1 leg of a single specimen. The name refers to the 9 branched tibia I setae.

Odontacarus (*O.*) *dienteslargus* n. sp.
(Fig. 6)

Type Data: Holotype, RML#53661, and 23 paratypes: 3 each-RML#53211 and 56006; 2 each-RML#s 52964, 53629, and 55988, 4-RML# 55984 and 1 each-RML#52962, 56001, 55939, 53685, 53639, 53637, and 53230, ex *Thomasomys hylophilus*, Venezuela, Táchira, 41 km SW San Cristóbal (Buena Vista), 2,385 to 2,423 m, 2-25 Mar 1968. N. E. Peterson, F. Brown, and J. Matson, collectors.

Holotype and Paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Differs from the closely related *O. munchiquensis* primarily in having PL $\geq$ AM $>$ AL, little variation in dorsal setae from anterior to posterior, and fewer ventral teeth on the cheliceral blades.

Description: *Idiosoma*: Broad ovoid to circular, length and width of holotype 257 and 228. Eyes 2/2; anterior 15, posterior 13 μm in diameter; plate present. About 130 dorsal setae, 36-86 μm long, midlaterals longest, arranged in uneven rows. Setae stout, with 4 rows of stout barbs, posterior setae stoutest. Two sternals plus about 90 ventrals, 35-70 μm in uneven rows; pre-anals slender with long setules, postanals like dorsals. Anus located approximately at fourth row of setae. Spiracles large, tracheae visible to coxa III. *Gnathosoma*: Cheliceral bases densely punctate; cheliceral blade length 74; 6-8 dorsal teeth; 12-13 ventral teeth, posterior teeth largest. Palpal formula B/B/BBB, femoral and genual setae moderately branched, with long branches; dorsotibial densely branched with short branches; laterotibial with 1-2 barbs, ventrotibial with 3-4 branches. Palpotibial claws trifurcate, axial prong longest. Palpotarsus 7B; tarsala 18 μm. Galeala sparsely branched. *Scutum*: Subpentagonal; moderately punctate; anterior and lateral margins slightly sinuate; apex of posterior margin bluntly angulate. Scutal setae similar to dorsals, AL's less stout than AM's and PL's. AM's lacking accessory branches. Proximal 2/3 of sensillae barbed, sensillar bases slightly posterior to PL's. Measurements of holotype: AW-99, PW-118, SB-47, ASB-43, PSB-27, AP-26, AMB-15, AM-77, AL-65, PL-77, S-116. Nasus 12 x 20. *Legs*: Coxae and leg segments moderately punctate. Distance between coxa I setae 37. Specialized setae as figured. Leg III with barbed mastitarsala. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 23,17,16. Leg index 931. Onychotriches absent.

Distribution: Venezuela: Mérida and Táchira.

Specimens Examined: Type specimens plus the following Venezuela material. Three larvae, ex *Cryptotis thomasi*, 2, ex *Oryzomys albigularis*, 1, ex *Chilomys instans* and 2, ex *Akodon bogotensis*, Táchira, 41 km SW San Cristóbal (Buena Vista), 2395-2410 m, 13 to 18 Mar 1968; 4, ex *Thomasomys laniger*, Mérida, 3 km W Timotes (Paramito), 3230 m, 16 Feb 1966.

Remarks: No significant variations were noted. The name refers to the cheliceral blades.

Odontacarus (*O.*) *pugnosus* n. sp.
(Fig. 7)

Type Data: Holotype, RML#51863 and 2 paratypes, RML#s 51854 and 52769, ex *Thomasomys laniger*, Venezuela, Mérida, 7-9 km SE Tabay, 3160-3785 m, 11-23 Mar 1966. Other paratypes: 2, RML#51866 and 1 each, RML#s 49054, 49053, 51867, 52814, and 49052, ex *Oryzomys minutus*, Venezuela, Mérida, 7-9 km SE

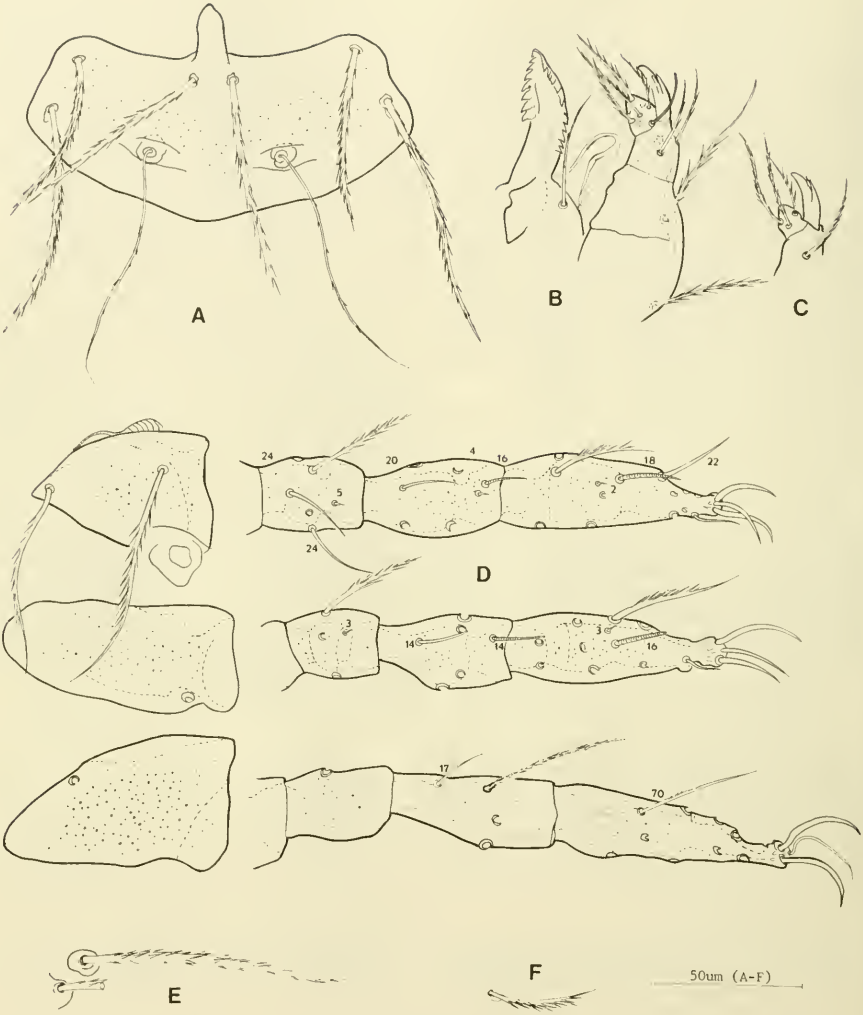

Fig. 6. *Odontacarus dienteslargus*, new species. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal claw and tarsus, dorsal aspect; D, coxae and leg segments showing specialized setae; E, anterolateral dorsal seta; F, antersubmedian ventral seta.

Tabay (La Coromoto), 3190-3370 m, 15-17 Mar 1966. N. E. Peterson, collector.

Holotypes and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: *O. pugnosus* differs from *O. tuberculohirsutus* in having appressed, short branches on the dorsal setae and the broad, short scutal nasus.

Description: *Idiosoma*: Ovoid; length and width of holotype: 388 and 278. Eyes 2/2 in

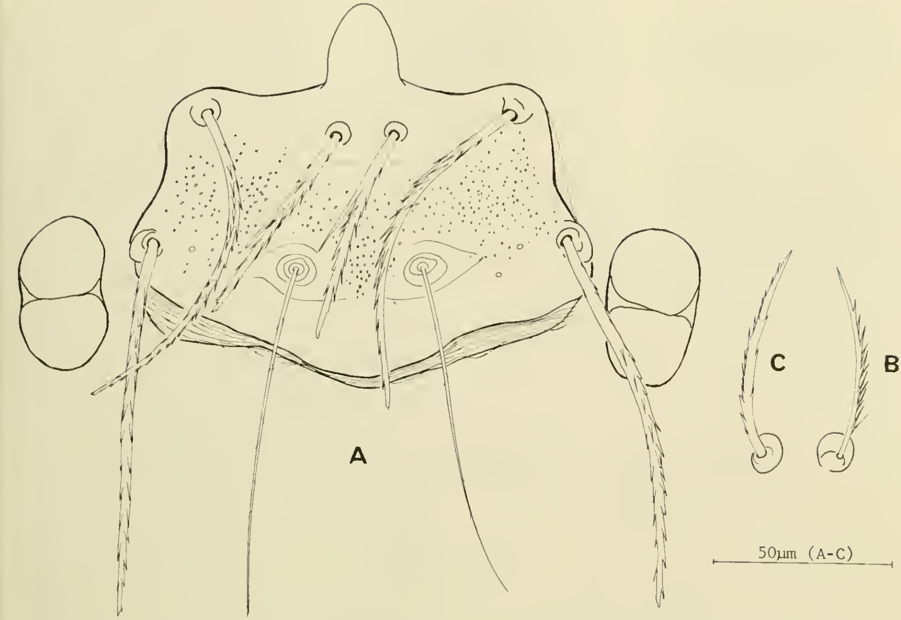

Fig. 7. *Odontacarus pugnosus*, new species. A, scutum; B, anterosubmedian ventral seta; C, anterosubmedian dorsal seta.

plates; anterior and posterior eyes subequal, 25 µm in diameter. About 180-200 stout, moderately branched dorsal setae, 96-101 µm long, anterolaterals longest. Humerals not distinguished from dorsal setae. Ventral setae slender, with long setules; 2 sternals plus about 130 ventrals in uneven rows, 57-81 µm long, becoming stouter posteriorly; posterior setae similar to dorsals. All setal bases large, tuberculate. Spiracles large, adjacent to anterodistal margin of coxa I; tracheae obvious, visible to posterior margin of idiosoma. *Gnathosoma*: Similar to that of *O. tuberculohirsutus*. Cheliceral bases densely punctate; blades 62 µm long, with 5-6 dorsal and 9-10 ventral teeth. Palpal formula B/B/BNB; femoral, genual and dorsotibial setae densely branched, laterotibial claws slender, trifurcate; para-axial prongs small. Palpotarsala 19 µm long; branched setae long, moderately branched. Galealae sparsely barbed. *Scutum*: moderately punctate; nearly quadrate, with broadly rounded to bluntly angulate posterior margin. Lateral scutal setae similar to dorsals; AM's with prominent, nude accessory branch. Sensillae long, with few minute barbs; bases slightly posterior to PL's. Measurements of holotype: AW-96, PW-117, SB-40, ASB-60, PSB-36, AP-43, AMB-18, AM-67, AMA-24, AL-106, PL-117, S-121. Nasus 20 x 25 µm. *Legs*: Coxae densely punctate; other segments moderately punctate. Distance between setae of coxae I: about 62. Specialized setae similar to those figured for *O. tuberculohirsutus*, but with mastitarsala III stouter and with numerous branches. Femur I and II, genu II and III, and tibia III with long, plumose setae. Branched setae per segment for legs I, II, and III: coxa 2,2,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8, 7,7; tarsus 38,29,24. Leg index 1280.

Distribution: Venezuela: Mérida state.

Specimens Examined: Type material.

Remarks: The name refers to the short, broad nasus.

Odontacarus (*O.*) *schoenesetosus* *n. sp.*
(Fig. 8)

Type Data: Holotype and one paratype, RML#49029, ex *Thomasomys vestitus*, Venezuela, Trujillo, 15 km E Trujillo (Hda. Misisí),

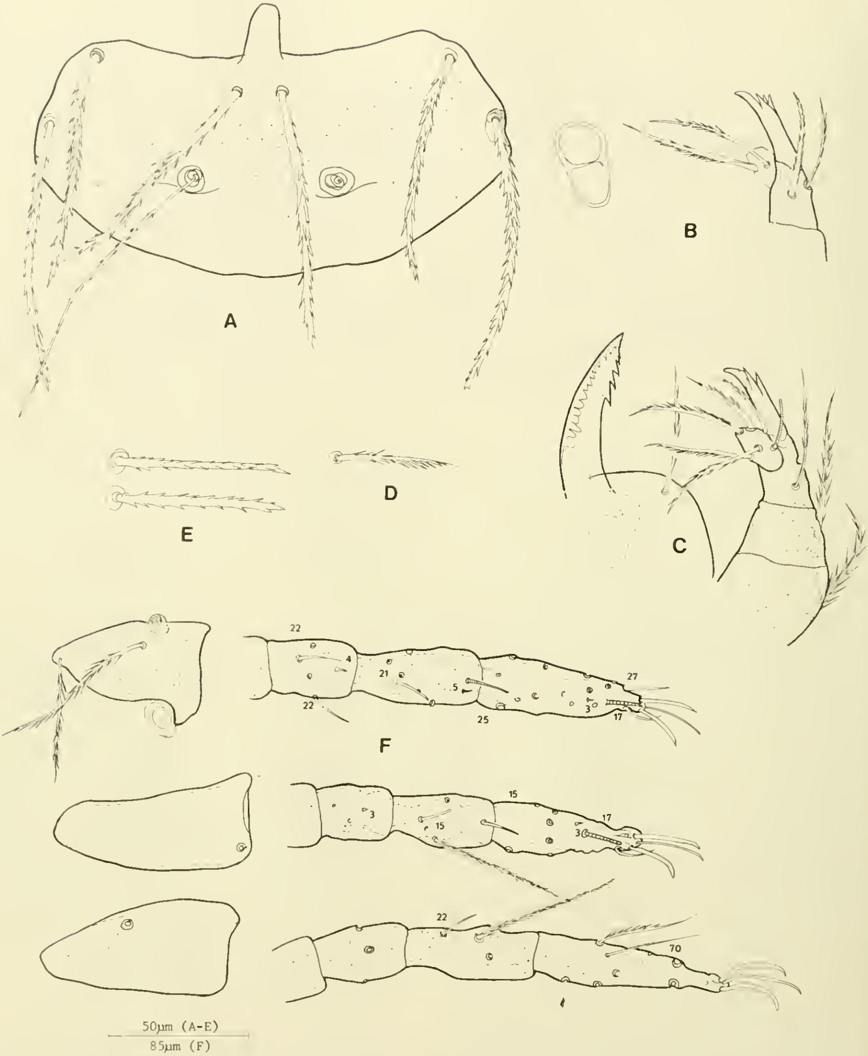

Fig. 8. *Odontacarus schoenesetosus*, new species. A, scutum; B, palpal tibia and tarsus, dorsal aspect; C, palpus and cheliceral blade, ventral aspect; D, anterosubmedoan ventrl seta; E, antersubmedian dorsal seta—top, dorsal aspect, bottom, ventral aspect; F, coxae and leg segments showing specialized setae.

2250 m, 29 Jan 1966. Other paratypes: 1, RML #49040 and 8, RML#52813, ex *T. laniger*, Venezuela, Mérida, 3 km W Timotes (Paramito), 3206-3230 m, 14 and 16 Feb 1966; 1 RML#48918 and 6, RML#48920, ex *T. lugens*, Venezuela, Trujillo, 15 km E Trujillo (Hda Misisí), 2350 to 2360 m. 25 and 26 Jan 1966; 11, RML#52808, ex *Lonchorhina aurita*, Venezuela, Trujillo, 25 km N Valera (Quebrada Seca), 131 m, 21 Oct 1965; 1, ex *Artibeus jamaicensis*, Venezuela, Trujillo, 25 km NW Valera (Agua Santa), 90 m, 22 Oct 1965. N. E. Peterson, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Cheliceral blades longer than 80 μm; scutum wide, with posterolateral setae far anterad of the sensillar bases, and with deeply sinuate anterior margin.

Description: *Idiosoma*: Broad ovoid to circular; length and width of holotype (unengorged): 288 and 283. Eyes 2/2 in a plate, anterior 18, posterior 17 μm in diameter. Approximately 150-200 dorsal setae in uneven rows, longer laterally and posteriorly, 38-86 μm long. Setal bases large, tuberculate. Setae stout, with 4 rows of short, stout barbs. Venter with two sternals plus about 100 ventral setae, 42 to 86 μm. Anterior ventrals slender with long branches; posterior ventrals similar to dorsals; bases tuberculate. Anus at about the fifth row of ventral setae. *Gnathosoma*: Cheliceral bases densely punctate; blades 80-100 μm; teeth large, numbering 7 to 8 dorsally and about 18 ventrally. Palpal formula B/B/BBB, the femoral, genual, and dorsotibial setae moderately branched; laterotibial and ventrotibial with 1 to few barbs, laterotibial occasionally nude. Palpotarsalae 14 μm; branched tarsal setae long, moderately branched. Tibial claws trifurcate, axial prong largest. Galealae sparsely branched with short barbs. *Scutum*: Moderately punctate. Shaped as figured, anterior margin deeply sinuate, posterior margin broadly rounded. Setae similar to dorsals but more heavily branched. AM with short accessory branch. Sensillae sparsely barbed entire length, bases considerably posterior to PL's. Measurements of holotype: AW-115, PW-147, SB-52, ASB-50, PSB-34, AP-25, AMB-17, AM-92, AMA-13, AL-83, PL-84, S-132. Nasus 12 x 21. *Legs*: Coxae and leg segments moderately punctate. Distance between coxa I setae 48. Parasubterminala I lacking. Mastitarsala III barbed. Specialized setae as figured. Branched setae plumose; femur I and II, tibia III, and genu III with very long, plumose setae. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,7,7; tarsus 33,22,19. Tarsal claws nude. Leg index 1133.

Distribution: Venezuela: Trujillo and Mérida states.

Specimens Examined: Type specimens.

Remarks: Variation noted in the species include 10 rather than 9 branched setae on tibia I, malformed cheliceral blades on one specimen, and very long cheliceral blades on another. The average length of the cheliceral blades is 84 μm.

Odontacarus (*O.*) *sunnianae* n. sp.
(Fig. 9)

Type Data: Holotype and 6 paratypes, RML #53580 and 14 paratypes as follows: 3 each RML #'s53581 and 53585, 2 each RML #'s53582 and 53583, 1 each RML#'s53584 and 53579, ex *Proechimys semispinosus*, Venezuela, Lara, 10 km N El Tocuyo (Caserio Boro), 518 m, 15 July 1968; 2 RML#53270, ex *P. semispinosus*, Venezuela, Falcón, 84 km NW Carora (Cerro Socopo) 1265 m, 13 May 1968. F. Brown, J. Madsen, A. L. and M. D. Tuttle, and N. E. Peterson, collectors.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Distinguished from other species of the genus by short, broad dorsal setae and a single genuala I.

Description: *Idiosoma*: Broad ovoid (engorged); length and width of holotype, 157 and 138. Eyes 2/2 in indistinct plate; anterior 11 μm posterior 9 μm in diameter. Dorsal setae 28-52 μm, longer laterally and posteriorly, with 2 rows of setules dorsally. Approximate dorsal formula: 2 humerals (52 μm)-8-8-8-10-8-6-2. Venter with 2 sternals plus about 42 ventral setae; pre-anals slender, with delicate barbs, becoming stouter laterally, 26-41 μm long. Postanals similar to dorsals. Anus located between rows 2 and 3. Spiracles large and conspicuous, adjacent to anterodistal margin of coxa I; tracheae visible for short distance only. *Gnathosoma*: Cheliceral bases moderately punctate, punctae indistinct; cheliceral blades 38 μm long, teeth small, numbering 5-6 dorsally and 5-6 ventrally. Palpal formula B/B/BBB; dorsotibial and ventrotibial setae with 1 or 2 barbs. Palpotarsalae about 8 μm long. Palpotibial claw trifurcate, axial prong largest. Galealae sparsely branched. *Scutum*: Small, sparsely punctate, subpentagonal; posterior margin broadly rounded to bluntly angulate. Scutal setae densely branched; laterals broadly curved, with fewer setules on inner side. Sensillae heavily barbed, branches more numerous and longer apically; sensillar bases even with PL's. Measurements of holotype: AW-65, PW-82, SB-23, ASB-27, PSB-18, AP-23, AMB-10, AM-42+, AL-42, PL-51, S-62. Nasus 9 x 12. *Legs*: Coxae and leg

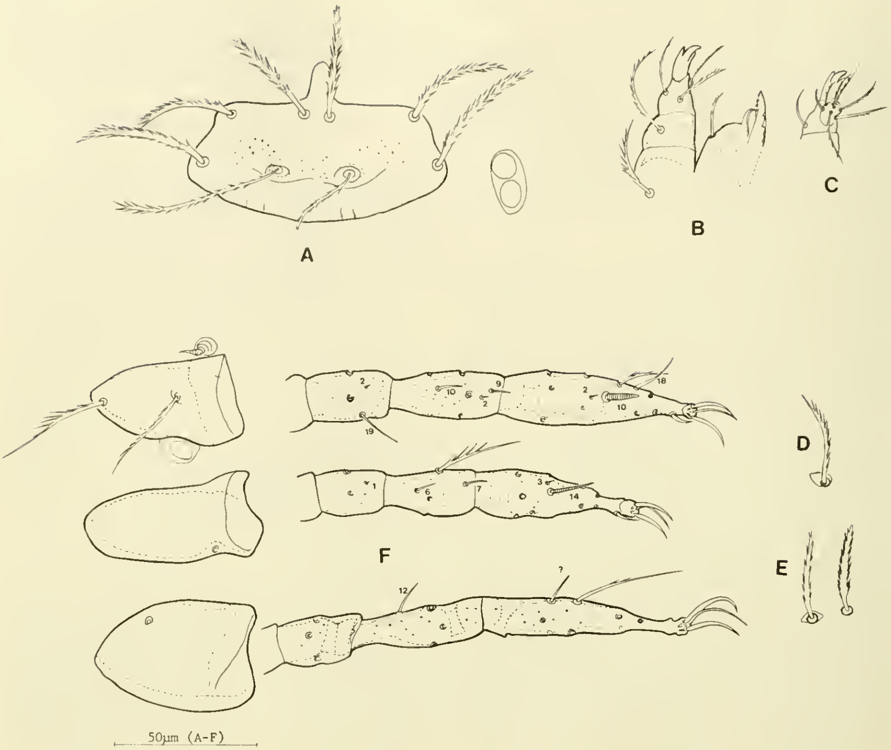

Fig. 9. *Odontacarus sunnianae,* new species. A, scutum; B, palpal tarsus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian ventral setae; E, anterosubmedian dorsal seta—left, ventral aspect, right, dorsal aspect; F, coxae and leg segments showing specialized setae.

segments with a few scattered punctae. Distance between coxa I setae 27-28. Legs short; parasubterminala on leg I lacking: mastitarsala III present, nude, apparently fragile. Tarsal claws with a pair of minute onychotriches visible in some specimens. Specialized setae as figured. Branched setae per leg segment for legs I, II, and III; coxa 2,1,1; trochanter 1,1,1; femur 5,5,4; genu 4,4,4; tibia 8,6,6; tarsus 22,16,14. Leg index 790. Onychotriches lacking.

Distribution: Venezuela: Barinas, Falcón, Lara and Miranda states.

Specimens Examined: Type specimens plus the following Venezuela material. One larva, ex *Didelphis marsupialis,* Miranda, 3 km NE Caracas (Quebrada Chacaito), 1150 m, 15 May 1967; 1, ex *Marmosa fuscata,* Aragua, 12 km N Maracay, 30 Mar 1960; 1, ex *Sciuris granatensis* and 2, ex *Proechimys semispinosus,* Barinas, Altamira, 600 and 794 m, 2 and 4 Jan 1968. 2, ex *Oryzomys albigularis,* Miranda, 1 km N Caracas (Quebrada Chacaito), 1150-1175 m, 18 May 1967; 2, ex *Sigmodon hispidus,* Lara, 10 km N El Tocuyo (Caserio Boro), 518 and 537 m, 15 and 17 July 1968.

Remarks: In addition to the type series and other records listed above, 2 specimens, ex *Proechimys semispinosus,* Falcón, Urama, 19 km NW Urama, 25 m, 26 Oct 1966, are considered here as a form of *O. sunnianae. O. sunnianae* was named for the wife of the senior author.

Odontacarus (*O.*) *tiptoni* n. sp.
(Fig. 10)

Type Data: Holotype and 7 paratypes, RML #49029, and 9 paratypes RML#48925, ex *Thom-*

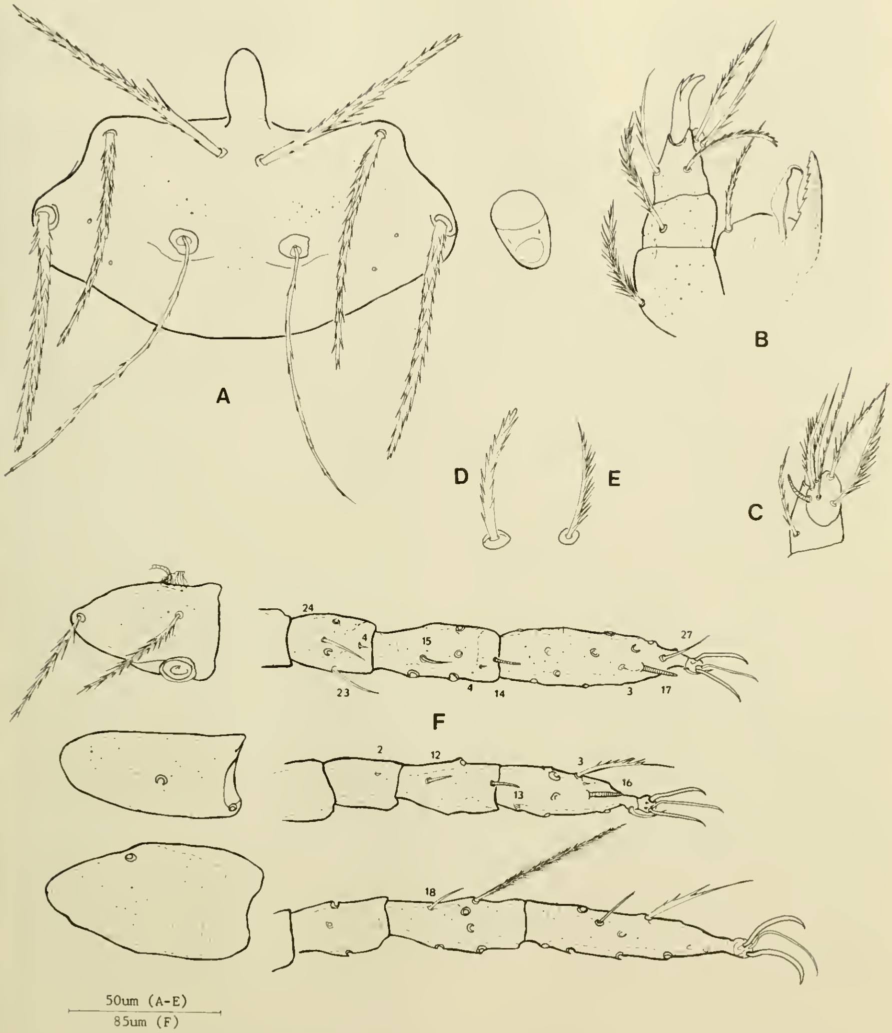

Fig. 10. *Odontacarus tiptoni*, new species. A, scutum; B, palpus and clericeral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

asomys vestitus; Other paratypes: 1 RML#48909, ex *Marmosa dryas;* 1 RML#48898, ex *Oryzomys albigularis;* 1 RML#49032, *O.* ex *minutus;* and 1, RML#48918, ex *Thomasomys lugens;* Venezuela, Trujillo, 15 km E Trujillo, 2350-2360 m, 19 to 29 Jan 1966. N. E. Peterson, collector. Holotype and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Distinguished from the closely related *O. schoenesetosus* n. sp. by the following combination of characters: AM, AL, and PL subequal. Two coxa II setae, short accessory branch on AM, and the stout, idiosomal setae.

Description: *Idiosoma*: Broad ovoid; length and width of holotype, 230 and 192. Eyes 2/2, in indistinct plates; anterior 18, posterior 13 μm in diameter. About 110 dorsal setae in uneven rows, 44-90 μm, becoming longer laterally and posteriorly. Humerals not distinguishable. Setal bases tuberculate; setae stout with 4 rows of setules. Two sternals plus about 60 slender pre-anals and 20 posterior ventral setae in uneven rows. Pre-anals more slender with longer setules, 40-70 μm long; postanals and lateral ventral setae similar to dorsals. Anus at fourth row of ventral setae. Spiracles large and conspicuous, adjacent to anterodistal margin of coxa I. Tracheae obvious, traceable throughout the idiosoma. *Gnathosoma*: Cheliceral bases densely punctate, punctae large and obvious; cheliceral blade length 50 μm; teeth small, about 7 dorsal, and about 10 ventral. Palpal formula B/B/BBB; the latero- and ventrotibial setae with 1 to several barbs; other setae densely branched. Palpotarsala about 11 μm long; branched tarsal setae long, moderately branched. Tibial claws trifurcate, axial prong largest. Galeala moderately branched. *Scutum*: Moderately punctate, subpentagonal, anterior margin slightly sinuate, posterior margin broadly rounded. Setae similar to dorsals. Sensillae lightly barbed along entire length, accessory branch present. Sensillar bases slightly posterior to PL's. Measurements of holotype: AW-93, PW-133, SB-47, ASB-43, PSB-33, AP-32, AMB-14, AM-83, AMA-12, AL-78, PL-84, S-95+ (AM, AL, and PL variable). Nasus 13 x 27. *Legs*: Coxae and leg segments moderately punctate. Distance between coxa I setae 50. Mastitarsala III barbed. Parasubterminala I lacking. Specialized setae as figured. Femur I and II, genu and tibia III with long, densely plumose setae. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,7,7; tarsus 34,21,19. Leg index 1147. Onychotriches lacking.

Distribution: Venezuela: Trujillo state.

Specimens Examined: Type specimens.

Remarks: Named for Dr. Vernon J. Tipton, Department of Zoology, Brigham Young University.

Odontacarus (*O.*) *tuberculohirsutus* n. sp.
(Fig. 11)

Type Data: Holotype and 8 paratypes, RML #49049, and 29 paratypes: 3, RML#49045, 7, RML#51851, 6, RML#51850, 5, RML#48116, 2, RML#49044, 1 each, RML#s 49046, 52774, 52771, 51861, 51849, 49042, ex *Thomasomys laniger*, Venezuela, Mérida, 7-9 km SE Tabay, 3160 to 3785 m, 11-23 Mar 1966, N. E. Peterson, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: *O. tuberculohirsutus* differs from other *Odontacarus* species by the combination of large, tuberculate setal bases, number and form of body setae, and large accessory branches on anterosubmedian scutal setae.

Description: *Idiosoma*: Ovoid; length and width of holotype: 451 and 336. Eyes 2/2 in plates; anterior 20, posterior 17 μm in diameter. About 200 slender dorsal setae, 60-105 μm, densely barbed, basal branches 6-8 μm. Posterior setae stouter, with short appressed barbs; lateroposterior setae longest. Humerals not distinguished from dorsal setae. Ventral setae 45-85 μm; 2 sternals, plus about 130 ventrals in uneven rows. All setal bases large, tuberculate. Spiracles large, adjacent to anterodistal margin of coxa I; tracheae obvious, visible to posterior margin of idiosoma. *Gnathosoma*: Cheliceral bases densely punctate; blades 64 μm long, with 5-6 dorsal teeth and 9-10 ventral teeth. Palpal formula B/B/BNB; femoral, genual and dorsotibial setae densely branched, laterotibial with an occasional barb, ventrotibial 3-4 branched. Palpotibial claws trifurcate. Palpotarsala 17 μm; branched tarsal setae long, moderately branched. Galealae sparsely barbed. *Scutum*: Moderately punctate, pentagonal; lateral margins sinuate, posterior margins sunken, with striations encroaching to raised portion of scutum. Scutal setae stout, AM's with prominent, nude accessory branch. AM's and AL's sparsely branched, with short appressed barbs. Posterior setae densely branched with longer branches. Sensillae slender, with few minute barbs; bases slightly posterior to PL's. Measurements of holotype: AW-103, PW-138, SB-35, ASB-62, PSB-42, AP-45, AMB-19, AM-82, AMA-24, AL-105, PL-107, S-135. Nasus 18 x 50 μm. *Legs*: Coxae densely punctate, leg segments moderately punctate. Distance between setae of coxa I, 57-65. Specialized setae as figured. Branched setae per leg segment, sequentially for legs I, II, and III: coxa 2,2,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,8,8; tarsus 40, 30, 28. Femur I and II, genu III and tibia III with 1-3 very long, plumose setae. Leg index 1245.

Distribution: Venezuela: Mérida state.

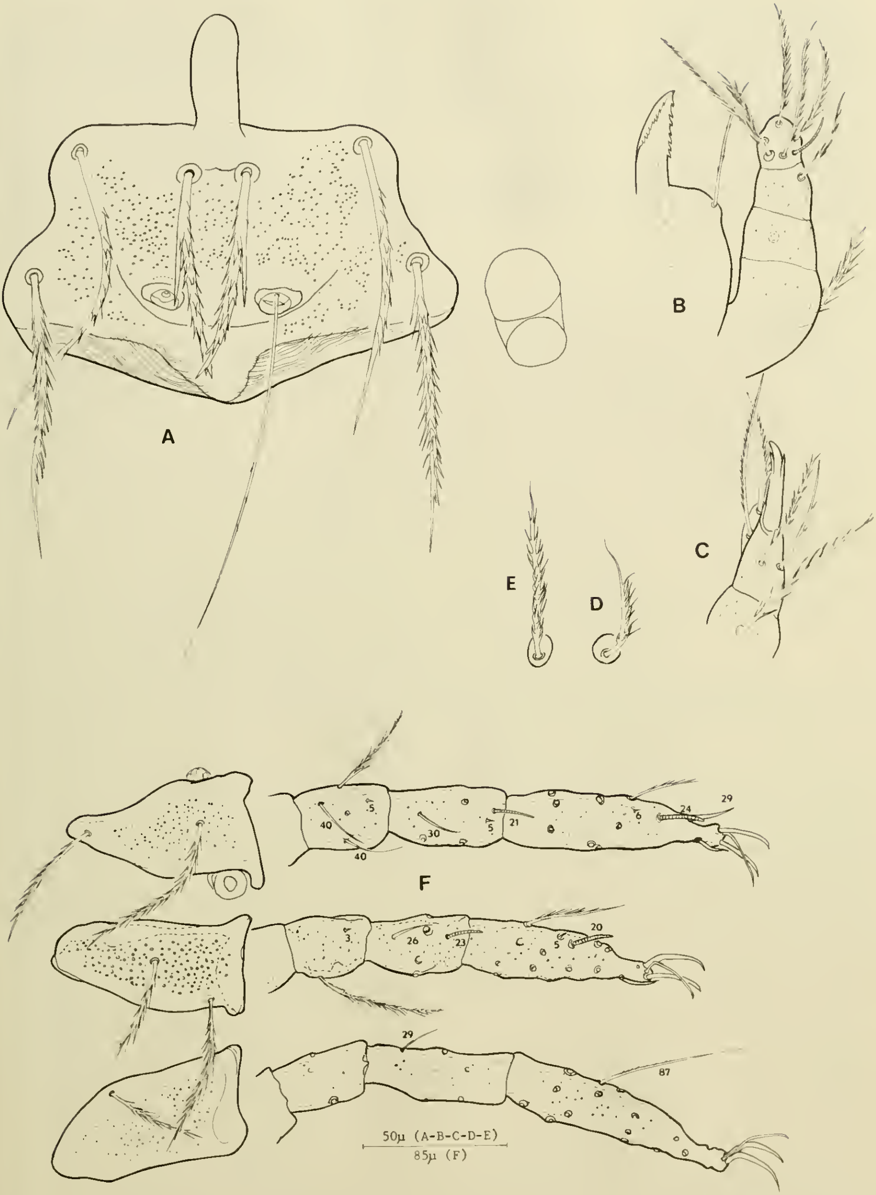

Fig. 11. *Odontacarus tuberculohirsutus*, new species. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal genu, tibia and tarsus, dorsal aspect; D, anterosubmedian ventral seta; E, anterosubmedian dorsal seta; F, coxae and leg segments showing specialized setae.

Specimens Examined: Type material, plus the following other Venezuela material: 5, ex *Oryzomys minutus*, Mérida, 4 km W Timotes (Paramito), 3294 m, 16 Sept 1966; 10, ex 8 *O. minutus* and 3, ex *Akodon bogotensis*, Mérida, 7-9 km SE Tabay (Le Coromoto and Laguna Verde) 3160-3785 m, 11-21 Mar 1966.

Remarks: Coxa II occasionally possesses 3 instead of 2 setae, and the degree of striation on the posterior margin of the scutum varies considerably among specimens. None of the material examined appeared to be engorged. The name was chosen in reference to the large, tuberculate setal bases and the large number of idiosomal setae.

Odontacarus (*O.*) *vanderhammeni* n. sp.
(Fig. 12)

Type Data: Holotype and 2 paratypes, RML #49039, ex *Oryzomys minutus*, Venezuela, Mé-

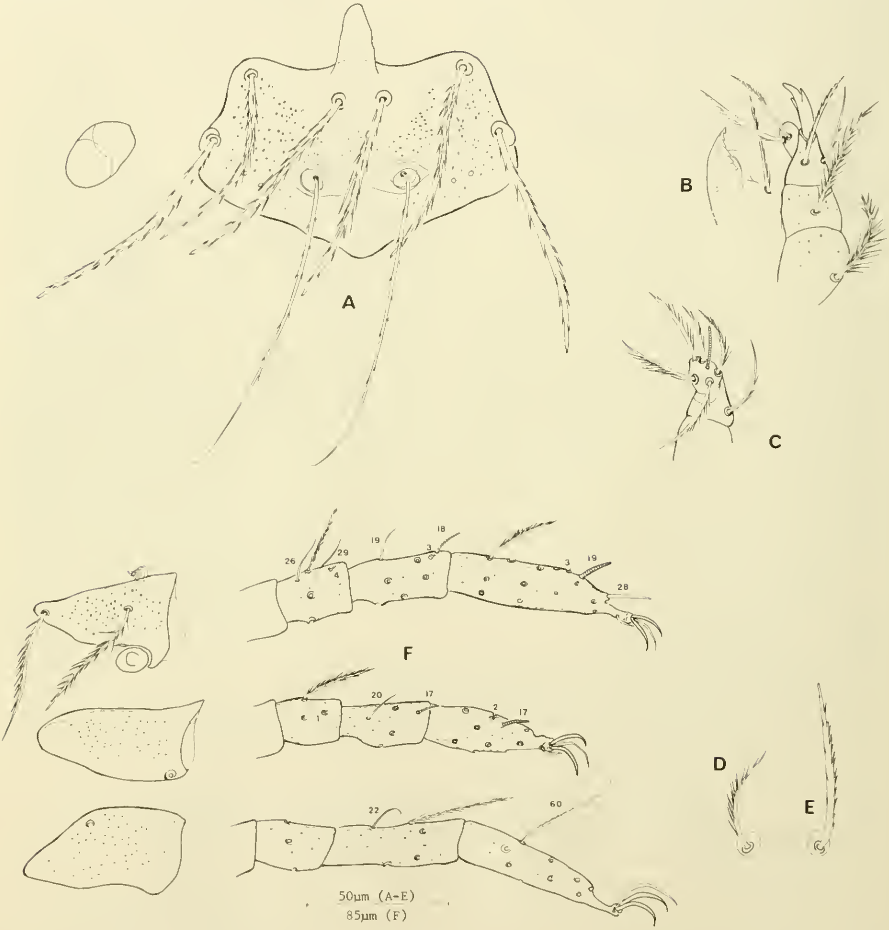

Fig. 12. *Odontacarus vanderhammeni*, new species. A, scutum; B, palpus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian ventral setal; E, middorsal seta; F, coxae and leg segments showing specialized setae.

rida, 4 km N Timotes (Paramito), 3294 m, 11 Feb 1966; other paratypes: 1 each, RML #48915 and 48902, ex *O. albigularis*, 1 each, RML#s 48931 and 48918, ex *Thomasomys lugens*, and 1 RML#48909, ex *Marmosa dryas*, Venezuela, Trujillo, 14 and 15 km E Trujillo (hda. Misisí), 2220-2360 m, 20 and 24 Jan 1966. N. E. Peterson, collector.

Holotypes and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Separates from other species with tuberculate setal bases by the following combination of characters: Sparsely barbed and tapered dorsal setae, angulate posterior scutal margin, moderately long accessory branches on anterosubmedian scutal setae, and unisetos coxa II.

Description: *Idiosoma*: Ovoid; length and width of holotype (engorged): 578 and 418. Eyes 2/2 in obscure plates; anterior 16, posterior 14 μm in diameter. Approximately 100 dorsal setae, in uneven rows, 41-75 μm long, laterally and posteriorly. Two humerals 80 μm long. Dorsal setae stout, tapered, sparsely branched with few closely appressed barbs on ventral side of setae. Venter with 2 sternals plus about 60 slender ventral setae, 38-65 μm long, and about 14 posterior setae similar to dorsals. Anterior ventrals with long branches, becoming gradually stouter until 2-3 rows posterad of anus. Anus at about fifth row of ventral setae. *Gnathosoma*: Cheliceral bases densely punctate. Blades 43 μm long with 6 dorsal and 7-8 ventral teeth. Palpal formula B/B/BBB; femoral and genual setae densely branched with long branches, dorsotibial moderately branched, laterotibial and ventrotibial with few barbs. Palpotarsalae 14 μm; branched tarsal setae moderately branched. Tibial claws trifurcate, axial prong largest. Galealae moderately branched. *Scutum*: Moderately punctate, shaped as figured; anterior margin mildly sinuate, posterior margin angulate. Anterior setae more densely branched than posterolateral setae, AM with moderately long accessory branch. Sensillae sparsely barbed, bases markedly posterior to PL's. Measurement of holotype: AW-85, PW-109, SB-34, ASB-46, PSB-39, AP-33, AMB-18, AM-75, AMA-23, AL-74, PL-84, S-120. Nasus 13 x 20. *Legs*: Coxae moderately punctate, other leg segments sparsely punctate. Distance between coxa I setae 41 μm. Femur I and II, genu and tibia III with long plumose setae, other branched setae densely to moderately branched. Branched setae per segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6 (9,7,7 in one specimen); tarsus 40+,23,18. Leg index 1111.

Distribution: Venezuela, Trujillo and Mérida states.

Specimens Examined: Type specimens.

Remarks: Named for Dr. L. van der Hammen, Rijksmuseum van Natuurlijke Historie, Leiden, the Netherlands.

Odontacarus (*O.*) *vergrandi* n. sp.

(Fig. 13)

Type Data: Holotype and 9 paratypes, RML #52811, ex *Thomasomys laniger*, Venezuela, Mérida, 3 km W Timotes (near Paramito), 3147 m, 15 Feb 1966; other paratypes: 2, RML #52813, ex *T. laniger*, 1, RML#52812 and 3, RML #52810, ex *Oryzomys minutus*, Venezuela, Mérida 3 and 4 km W Timotes (near Paramito), 3140 to 3230 m, 15 and 16 Feb 1966; 4, RML #52808, ex *Lonchorina aurita*, Venezuela, Trujillo, 25 km N Valera (Quebrada Seca), 131 m, 21 Oct 1965. N. E. Peterson, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Differs from *O. comosus comosus*, n. ssp. by the slightly different shape of scutum, more and stouter idiosomal setae, and the branched setae of tibia I, II, and III numbering 9-7-7, respectively.

Description: *Idiosoma*: Broad ovoid. Length and width of holotype (unengorged) 288 and 252. Eyes 2/2 in plates; anterior 16 posterior 14 μm in diameter. Dorsal and ventral setal bases large, tuberculate. Dorsal setae 45 to 96 μm, longer laterally and posteriorly with 4 rows of setules. Total dorsal setae about 110 in uneven rows. Humerals not distinguishable. Venter with two sternals and 35 slender pre-anals (40-50 μm), plus about 20 postanals and laterals similar to dorsals. Anus at fourth row of ventral setae. Spiracles prominent, adjacent to anterior margin of coxa 1. Tracheae convolutant, visible throughout idiosoma. *Gnathosoma*: Cheliceral bases moderately punctate; blades 54 μm long with 7 dorsal and 6-7 ventral teeth, widely spaced. Palpal formula B/B/BBB; latero- and ventrotibial sparsely branched, others moderately branched. Palpal tarsala about 12 μm; branched tarsal setae long and slender with long branches. Tibial claws trifurcate, axial prong largest. Galealae with few barbs. *Scu-*

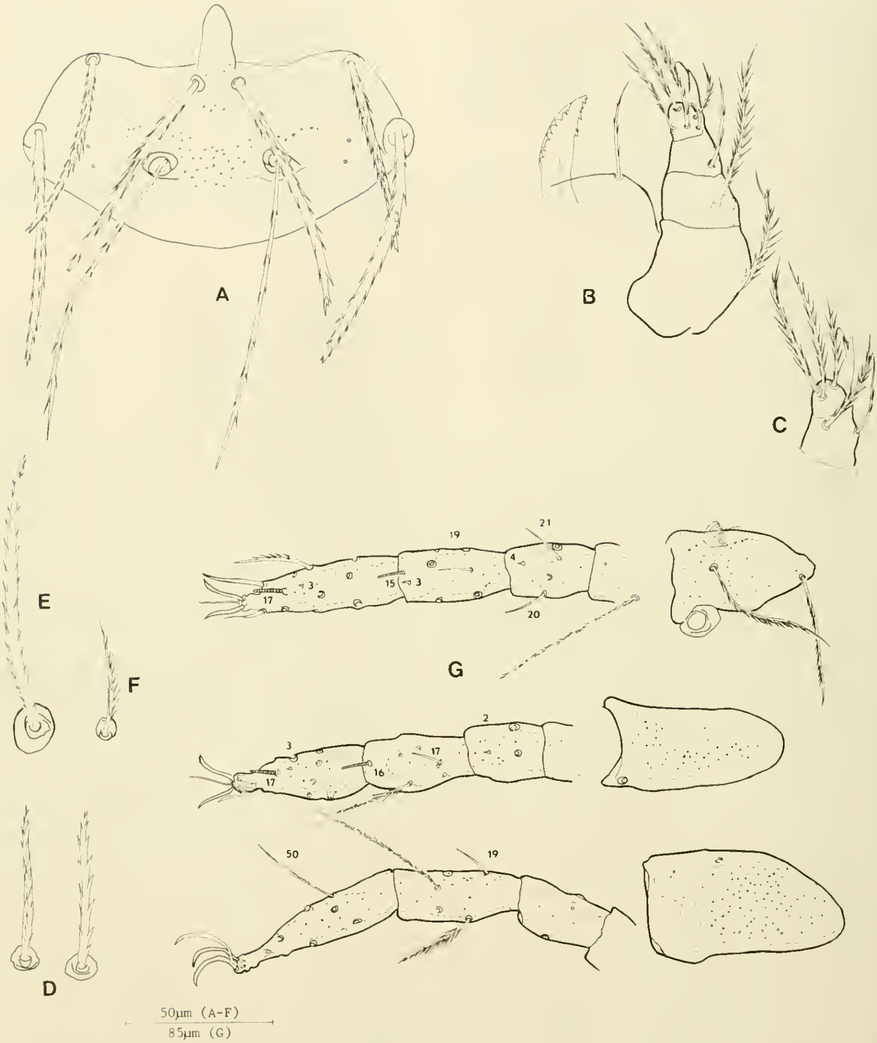

Fig. 13. *Odontacarus vergrandi,* new species. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal tibia an dtarsus, dorsal aspect; D, anterosubmedian dorsal seta—left, dorsal aspect, right, ventral aspect; E, anterolateral dorsal seta; F, anterosubmedian ventral seta; G, coxae and leg segments showing specialized setae..

tum: Sparsely punctate. Shaped as figured with slightly sinuate anterior margin and broadly rounded posterior margin. Scutal setae similar to dorsals; AM's with short, stout accessory branch; AL's apparently lacking barbs on concave side of curvature. Sensillae delicately barbed; barbs longer apically; bases slightly posterior to PL's. Measurements of holotype: AW-92, PW-132, SB-38, ASB-40, PSB-29, AP-32, AMB-15, AM-86, AMA-10, AL-67, PL-77, S-116.

Nasus 12 x 21. *Legs:* Coxa I sparsely punctate, punctae coarse; coxae II and III moderately punctate, punctae fine. Leg segments sparsely punctate. Distance between coxa I setae 45-47. Parasubterminala I lacking. Femur I, II, and III, genu II, and tibia III each with 1 or 2 long, plumose setae. Mastitarsala III minutely barbed. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5, 4; genu 4,4,4; tibia 9,7,7; tarsus 30,20,16-17. Leg index 1060.

Distribution: Venezuela, Mérida and Trujillo states.

Specimens Examined: Type specimens.

Remarks: Named for Dr. P. H. Vercammen-Grandjean, G. W. Hooper Foundation, University of California Medical Center, San Francisco.

Subgenus *Tarsalacarus* Vercammen-Grandjean

Odontacarus (*Tarsalacarus*) Vercammen-Grandjean, 1968:121 [Type species: *Acomatacarus bakeri* (Hoffman), original designation].

Diagnosis: Larvae with tarsala III; cheliceral blades with ventral row of teeth only.

Redescription: Larvae possessing cheliceral blades with ventral row of teeth only. Palpotibial claws quadrifurcate on neotropical species. Palpal formula B/B/BBB. Tarsala III present, mastitarsala III lacking. Coxa III with blunt projection on anteromedian margin.

Odontacarus (*Tarsalacarus*) *bakeri* (Hoffmann) (Fig. 14)

Acomatacarus bakeri Hoffmann, 1951:31 [Holotype, larva, *Peromyscus truei gratus*, México; Hoffmann collection, México, D.F.] Greenberg 1952:477 and 482.

Odontacarus bakeri, Brennan 1959:1; Brennan and Dalmat 1960:184; Wharton and Fuller 1952:97.

Diagnosis: Differs from other members of the genus by the subquadrate scutal shape, long-branched scutal and idiosomal setae, densely branched galeal setae, and tarsala III

Redescription (Based on a specimen determined by Hoffmann, see remarks below. Data from original description parenthetically included). *Idiosoma*: Broad ovoid; length and width (engorged) 911 and 625 (type series: 426-790 and 220-373, Hoffmann, 1951). Eyes 2/2; anterior 16, posterior 12 μm in diameter. Setal bases apunctate. Dorsal setae 42-65 μm (variable), arranged approximately 2-10-11-12-2-15-12-8+24. Venter with two sternals, 34 preanals, and about 70 postanals. Anus at about fifth row of ventrals. Spiracles prominent, adjacent to anterodistal margin of coxa I. Tracheae obvious to posterior margin of idiosoma, not densely convoluted as original figures indicate. *Gnathosoma*: Cheliceral bases moderately punctate; blades about 45 μm long, with 1 apical dorsal tooth and 4 or 5 small ventral teeth. Palpal formula B/B/B/BB, all setae moderately to densely branched. Palpotibial claws quadrifurcate; branched palpotarsal setae long, heavily branched. Tarsalae 8 μm. Galealae densely branched. *Scutum*: Shaped as figured, sparsely punctate, punctae indistinct. Posterior margin broadly rounded, anterior margin mildly sinuate; PL's on lateral extension of scutum. Scutal setae similar to dorsals. Sensillae minutely barbed along basal fourth; bases slightly posterior to PL's. Measurements: AW-80, PW-93, SB-28, ASB-39, PSB-26, AP-32, AMB-11, AM-64, AL-48, PL-77, S-80. Nasus 7 x 16. *Legs*: Coxae moderately punctate. Distance between coxae I setae 47 μm. Parasubterminala I absent. Specialized setae as figured. Mastitarsala III absent. Branched setae per leg segment: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6; tarsus 28,16,15. Leg index 1060.

Distribution: Distrito Federal, México, and Jalapa, Guatemala.

Specimens Examined: 1 larva, ex *Peromyscus truei gratus*, Distrito Federal, México, Mar 1951; 4, ex *Reithrodontomys* sp., and 5, ex *Peromyscus guatemalensis*, Jalapa, Guatemala, Mar 1952.

Other Material: Reported off *Peromyscus guatemalensis*, Guatemala, Mar 1952 and *Baiomys taylori*, México, D.F. (Brennan, 1960).

Remarks: The type material was unavailable at the time of writing, hence the redescription is based on a specimen identified by Dr. Hoffmann as *O. bakeri*. Considerable variation is apparent in the specimens examined. Length of setae varied from 35-52 in one specimen to 42-65 in another, and the number of dorsal setae in the series RML#31460 varied from 60± to 90± total.

Contradictions between these findings and the original description include the number of branched tibial and tarsal setae (8,6,6 and 25, 14,16, respectively, in original description) and minute barbs on the sensillae which were described as nude.

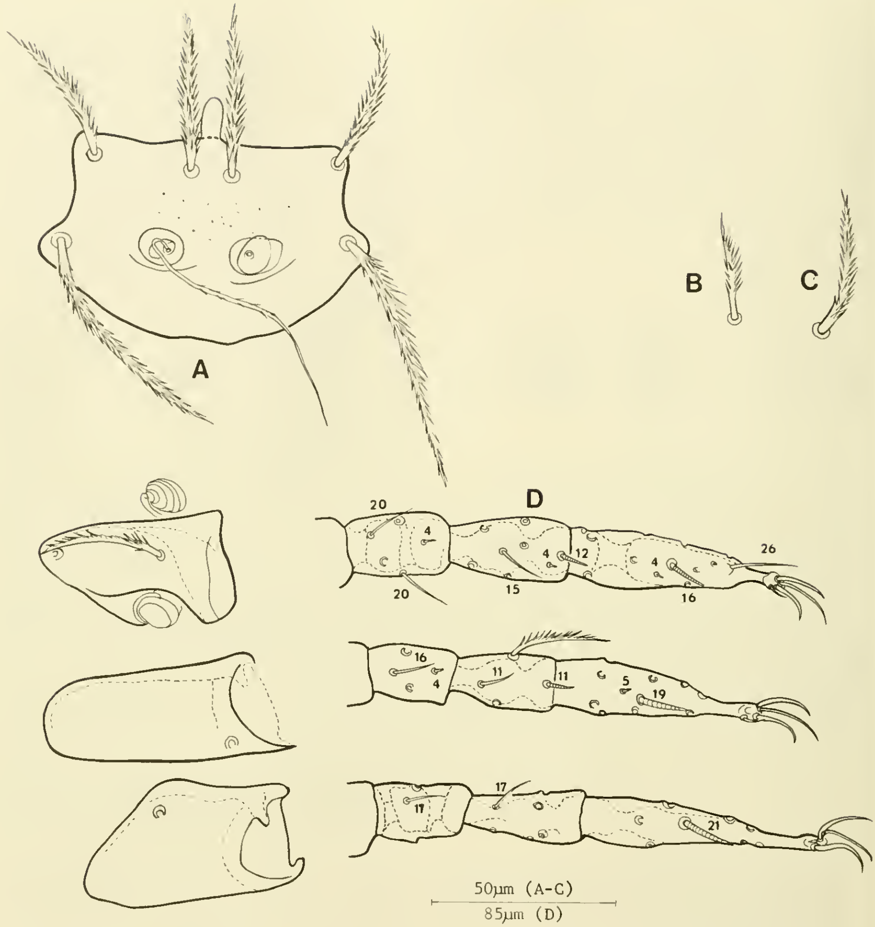

Fig. 14. *Odontacarus* (*Tarsalacarus*) *bakeri*. A, scutum; B, anterosubmedian ventral seta; C, anterolateral dorsal seta; D, coxae and leg segments showing specialized setae.

Odontacarus (*Tarsalacarus*) *chiapanensis*
(Hoffmann)
(Fig. 15)

Acomatacarus chiapanensis Hoffmann, 1948:179 [Holotype, larva; ex undetermined rodent, "Tepeizcuinte," Chiapas, México; Hoffmann collection, Ciudad, México]; Greenberg, 1952: 482.

Odontacarus chiapanensis: Brennan, 1959:1; Brennan and Jones, 1959:11; Brennan and Yunker, 1966:224; Loomis, 1969:5.

Diagnosis: Separated from *O. bakeri* by fewer dorsal setae and the sparsely branched palpal setae.

Description (based on Panama specimens [see remarks]): *Idiosoma*: Ovoid; Length and width, 245-535 and 192-324 (Type material 519-618 and 330-357, Hoffmann, 1948). Eyes 2/2 in plates; anterior 12, posterior 9 µm in diameter. Setal bases normal. Dorsal setae 34-50 µm, longer laterally and posteriorly; arranged approximately: 2 humerals (60 µm)-8-4-6-8-6-6-2 plus

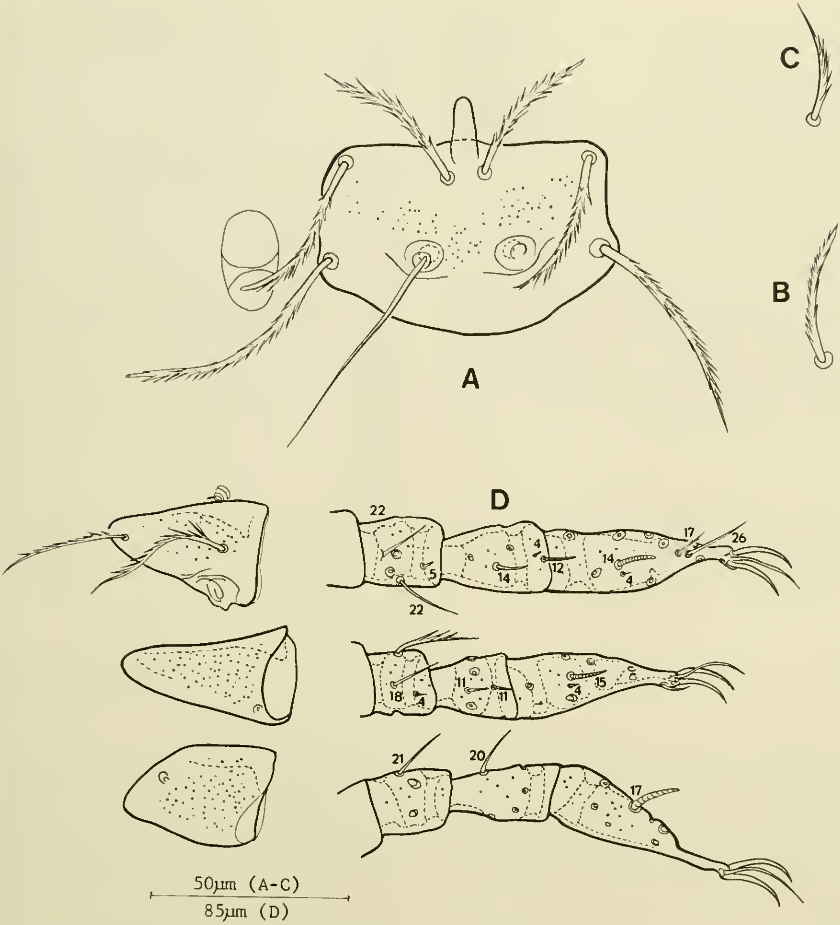

Fig. 15. *Odontacarus* (*Tarsalacarus*) *chiapanensis*. A, scutum; B, anterosubmedian dorsal seta; C, anterosubmedian ventral seta; D, coxae and leg segments showing specialized setae.

5 lateral setae not continuous with dorsal rows (original description [6,4,2]-6-10-8-6-6). Venter with 2 sternals, 28 slender pre-anals (26-34 µm), and 22 postanals similar to dorsals. Anus at fourth row of ventral setae. *Gnathosoma*: Cheliceral bases moderately punctate posteriorly; blades 43 µm long with a single apical dorsal tooth and a row of 5 or 6 ventral teeth. Palpal formula B/B/BBB; genual setae moderately branched, laterotibial nude or with few branches, others sparsely branched. Palpal tarsala 7 µm long; branched tarsal setae sparsely branched. Tibial claws quadrifurcate, inner prong largest. Galealae sparsely branched. *Scutum*: Sparsely punctate; shaped as figured, posterior margin broadly rounded to semitruncate medially. Scutal setae similar to dorsals. AM with accessory branch located medially (not visible on all specimens). Sensillae nude, bases slightly anterior to PL's. Measurements of one specimen, partially engorged: AW-67, PW-71, SB-21, ASB-29, PSB-19, AP-25, AMB-11, AM-40, AMA-8, AL-42, PL-59, S-72. Nasus 6 x 19. *Legs:* Coxa I and III sparsely punctate; coxa II moderately punctate.

Distance between coxa I setae, 38 μm. Parasubterminala I lacking (see remarks). Specialized setae as figured. Mastisetae lacking. Branched setae per leg segment for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6; tarsus 25,16,15. Leg index 810.

Distribution: Chiapas and Yucatán Peninsula, México; Bocas del Toro, Panamá.

Material Examined: 8 larvae, ex *Proechimys semispinosus*, Bocas del Toro, Panamá, Jan and Apr 1960.

Other Material: Holotype and paratypes, ex unidentified rodent, "Tepeizcuinte," Chiapas, México (Hoffmann, 1948:182). Also reported off *Ototylomys phyllotis* and *Peromyscus yucatanicus*, Yucatán Peninsula, México (Loomis, 1969: 5), and *Proechimys semispinosus*, Bocas del Toro, Panamá (Brennan and Yunker, 1966:224).

Remarks: Type specimens were unavailable at the time of writing; however, the presence of a quadrifurcate palpal claw had been observed earlier by Brennan (unpublished notes) while examining a paratype. Other differences from the original description include the branched galeal and palpal laterotibial setae noted by Greenberg (1952:482). The "single branched parasubterminala" on leg I as noted by Greenberg was found to be 1- or 2-branched and therefore is not considered here as a parasubterminala in the strict sense.

Genus *Sasacarus* Brennan and Jones

Sasacarus Brennan and Jones, 1959:8 [Type species: *Chatia furmani* Hoffmann, 1954, original designation]; Vercammen-Grandjean, et al., 1973:64.

Diagnosis: Larvae possessing spiracles and tracheae, 2 sternal setae, anterolateral projections of the scutum, and empodia on leg tarsi.

Redescription: Larvae parasitic on small rodents. Cheliceral blades with tricuspid cap only. Palpotibial claw with one large prong, several small outer prongs and dorsal and ventral rows of slender prongs. Palpotarsus 7B plus tarsala. Galealae branched. Spiracles and tracheae present. Scutum with anterolateral projections; posterolaterals far forward. Sensillae nude. Two genualae I, a genuala II and III. Coxa I bisetose, coxae II and III unisetose. Matisetae absent. Femora I, II, and III with 6, 7, and 5 branched setae, respectively. Onychotriches present.

Key to Subspecies

1. Scutal setae very stout, PL's about 60 μm .... *S. furmani panamensis*
2. Scutal setae not obviously stout, PL's about 45 μm .... *S. furmani furmani*

Remarks: *Sasacarus* closely resembles the genus *Chatia*, subgenus *Shunsennia* Jameson and Toshioka, in the number of branched setae on the femora of the legs, the form of the palpal setae (femoral and genual setae plumose) and the genuala configuration 2+, 1+, 1 for legs I, II, and III. Vercammen-Grandjean, et al., group *Sasacarus* with the genus *Chatia* on the basis of the branched femoral setae and consider it a valid generic entity. Addition of *S. f. panamensis* n. ssp. supports the generic status.

Sasacarus furmani furmani (Hoffmann)

Chatia furmani Hoffmann, 1954:17 [Holotype, larva; ex *Baiomys musculus musculus*, Oaxaca, México; Rocky Mountain Laboratory, Hamilton, Montana].

Sasacarus furmani, Brennan and Jones, 1959:8; Brennan and Yunker, 1966:224.

Diagnosis: Differs from the Panama subspecies by the shorter more slender dorsal setae and branched setae on legs.

Redescription: *Idiosoma*: Ovoid. Length and width of holotype 568 and 408 (idiosoma ruptured, measurements approximate). Eyes single, 14 μm in diameter. Dorsal setae 35-54 μm, longer anterolaterally, sparsely barbed ventrally and densely barbed dorsally; arranged in uneven rows approximately: 11-9-12-2 (lateral) -10-2 (lateral) -10 plus 24 posteriorly. Two sternals and 56 ventrals, 25-38 μm, longest laterally, in uneven rows; anterior setae shorter and somewhat more slender than posterior setae. Anus between fourth and fifth rows of ventral setae. Spiracles large, adjacent to anterior margin of coxa I. Tracheae traceable to posterior third of idiosoma. *Gnathosoma*: Cheliceral bases apparently apunctate; blades 39 μm long with tricuspid cap only. Palpal formula B/B/BBB, moderately to densely branched. Tarsi 7B plus tarsala, setae long, moderately branched. Tibial claws forming a cupped shape, with 1 large prong, 7 or 8 smaller prongs outer and dorsally, becoming more slender proximally, plus row of 6 slender prongs ventrally. Galealae moderately branched with long slender branches. *Scutum*:

Shaped as originally figured by Hoffmann; sparsely punctate. PL's far anterior, AL's on anterolateral extractions of scutum. Anterior margin sinuate, posterior margin broadly rounded. Setae similar to dorsals, densely branched. Sensillae nude. Measurements of holotype: AW-82, PW-84, SB-41, ASB-36, PSB-21, AP-15, AMB-9, AM-27, AL-34, PL-44, S-60. *Legs*: Coxae and leg segments with few punctae. Distance between coxa I setae 44 μm. Specialized setae as figured for *Sasacarus furmani panamensis* n. ssp.; sub- and parasubterminala lacking. Branched setae moderately plumose, with stiff branches. Apical setae with fewer branches. Tarsal claws with a pair of onychotriches, empodia apparently nude. Branched setae per segment for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,7,5; genu 4,4,4; tibia 8,6, 6; tarsus 28,17,15. Leg index 846.

Distribution: Oaxaca, México.

Material Examined: Holotype only.

Other Records: One paratype, ex *Baiomys musculus musculus*, Oaxaco, México. Panama records (Brennan and Yunker, 1966) are *S. furmani panamensis* n. ssp.

Sasacarus furmani panamensis n. ssp.
(Fig. 16)

Type data: Holotype, RML#44965, ex *Proechimys semispinosus*, France Field, Panama Canal Zone, 8 Sep 1961; Paratypes: 2, RML#40125, ex *P. semispinosus*, Piña, Panama Canal Zone, 13 Dec 1960; 2 RML#44105, ex *P. semispinosus*, France Field, Panama Canal Zone, 16 Nov 1961; 1, RML#35276, ex *P. semispinosus panamensis*, Panamá 7 Jan 1954; 1, RML#44401, ex *P. Tylo-*

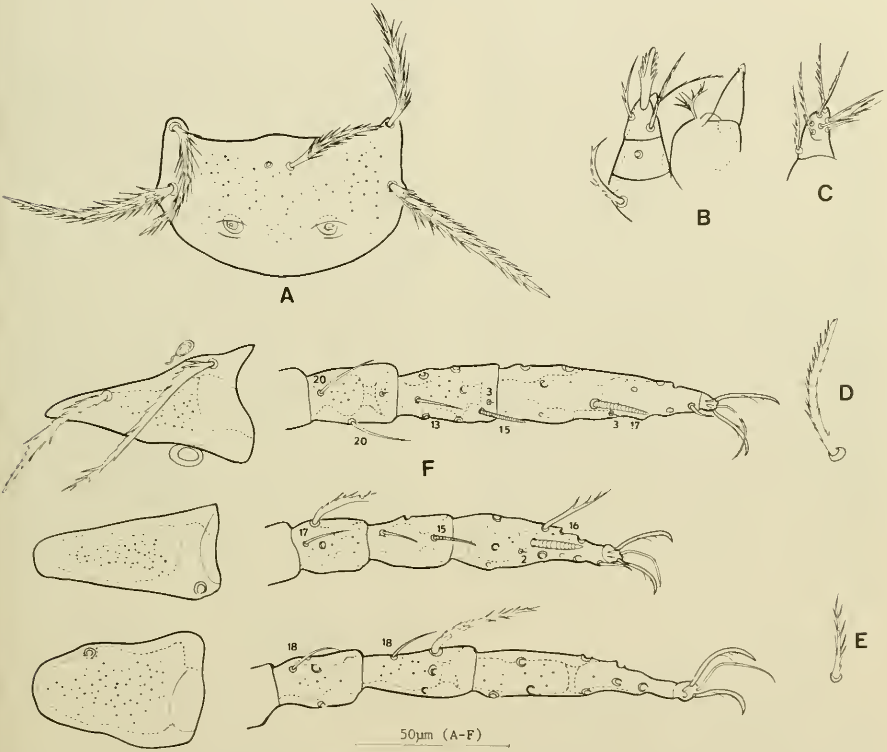

Fig. 16. *Sasacarus furmani panamensis*. A, scutum; B, palpus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

mys watsoni, Piña, Panama Canal Zone, 7 Feb 1954. C. M. Keenan, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Separates from nominate subspecies primarily by stouter idiosomal, scutal, and leg setae and longer scutal setae.

Description: *Idiosoma*: Broad ovoid to circular (engorged). Length and width of holotype: 452 and 388. Eyes present 12-13 μm in diameter (not seen on holotype). Setal bases not tuberculate, setae stout, 45-51 μm, longer laterally, with 3-4 rows of stout branches, arranged approximately 12-8-8-10-9-6-4-2. Two sternals plus about 66 ventrals, 24-41 μm, shorter and more slender anteriorly, becoming gradually like dorsals posteriorly. Anus between second and third row of ventral setae. Spiracles obvious, between coxa I and palpal coxa. Tracheae visible to mid-idiosoma in some specimens. *Gnathosoma*: Cheliceral bases moderately, lightly punctate. Blades 36 μm long, with tricuspid cap only. Palpal formula B/B/BBB, moderately branched; laterotibial seta slender, sparsely to moderately barbed. Tibial claws with large axial prong, 4 outer prongs, and apical row of smaller prongs dorsally and ventrally. Galealae moderately barbed with long branches. *Scutum*: Shaped as figured, similar to that of *S. furmani*. Sparsely punctate. Setae stouter than dorsals. Sensillae not seen; bases located posterior to PL's. Measurements of holotype AW-70, PW-71, SB-31, ASB-34, PSB-14, AP-18, AMB-9, AM-36, AL-48, PL-62, S–. *Legs*: Coxae moderately punctate, other leg segments sparsely punctate. Distance between coxa I setae 36-38 μm. Specialized setae as figured, sub- and parasubterminala lacking. Branched setae stout, moderately branched; setules apparently caducous. Tarsal claws with at least a pair of long onychotriches. Empodia nude. Branched setae per leg segment for legs I, II, and III: Coxa 2, 1, 1; trochanter 1, 1, 1; femur 6, 7, 5; genu 4, 4 ,4; tibia 8, 6, 6; tarsus 28, 17, 15. Leg index 776.

Distribution: Panamá.

Material Examined: Type material.

Other Records: Piña, Gamboa Road, Fort Gulick, and France Field, Bocas del Toro province, Panamá. Hosts: *Didelphis marsupialis*, *Heteromys desmarestianus*, and *Proechimys semispinosus*, Nov to Apr 1954-1962 (Brennan and Yunker, 1966:224).

Genus *Wagenaaria* Brennan

Wagenaaria Brennan, 1967:148 [Type species: *Wagenaaria similis* Brennan, original designation]; Vercammen-Grandjean, et al., 1973:64.

Diagnosis: Larvae lacking spiracles, tracheae, eyes, and nasus. Scutum with submarginal anterolateral setae; venter with 2 sternal setae. Parasitic on bats.

Redescription: Parasitic on bats. Palpal tarsus 7B plus tarsala. Palpotibial claws with several slender prongs. Cheliceral blades with small tricuspid cap. Scutum with a pair each of anterosubmedian, anterolateral, and posterolateral setae. Sensillae flagelliform, bases far posterad of posterolateral scutal setae. Coxa I bisetose, coxae II and III unisetose. Tarsal claws with long onychotriches, empodia nude.

Wagenaaria similis Brennan
(Fig. 17)

Wagenaaria similis Brennan, 1967:148 [Holotype, larva, ex *Mormoops megalophylla*, Cueba di Ratón, Hato, Curaçao; Rocky Mountain Laboratory, Hamilton, Montana]; Loomis, 1969:5; Vercammen-Grandjean, et al., 1973:64.

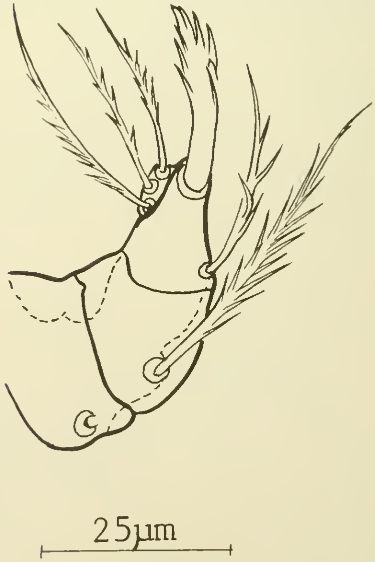

Fig. 17. *Wagenaaria similis*. Dorsal aspect of palpus showing shape of tibial claw.

Diagnosis: Larvae lacking spiracles, tracheae, eyes, and nasus. Scutum with submarginal anterolateral setae; venter with 2 sternal setae. Parasitic on bats.

Redescription: *Idiosoma*: Long ovoid. Length and width of holotype 450 and 305. Eyes lacking. About 200 dorsal setae in uneven rows, 30-52 μm, longest anterolaterally. Two sternals plus about 140 ventrals, 24-32 μm long; pre-anals similar to postanals. Anus located at anterior third of ventral setae. All setae slender, moderately barbed. Spiracles and tracheae lacking. *Gnathosoma*: Chericeral bases moderately punctate, blades 37 μm long, with small bicuspid cap. Palpal formula B/B/BBB, all setae stout, with long setules (ca. 10 μm). Tarsalae 5-8 μm. Tarsus 7B, branched setae sparsely branched. Tibial claws with ventral row of prongs and a few large apical prongs forming a cupped shape. Galealae sparsely barbed. *Scutum*: Shaped as originally figured: Moderately punctate; anterolateral angles acute; posterior margin broadly rounded, with mild indentation medially. Nasus lacking. Scutal setae similar to dorsals. Sensillae nude; bases posterior to PL's. Measurements of holotype: AW-57, PW-69, SB-31, ASB-38, PSB-11, AMB-9, AM-53, AL-39, PL-40, S-85. *Legs*: Coxae moderately to densely punctate, other leg segments sparsely punctate. Specialized leg setae as originally figured, but with microtarsala II laterad of Tarsala II. Tibiala formula 2+,2,1. Microgenualae and microtibialae 6-7 μm long. Branched setae per leg segment for legs I, II, and III. Coxa 2,1,1; trochanter 1,1,1; femur 6,7,5; genu 4,4,4; tibia 8, 6,6; tarsus 29,17,17. Branched setae stout, sparsely to moderately branched. Onychotriches long, empodium nude. Leg index 892.

Distribution: México, Curaçao, Venezuela.

Specimens Examined: Holotype and 4 paratypes, ex *Mormoops megalophylla*, Hato, Curaçao, Sep, Oct, and Nov 1948; 1, ex *Pteronotus davyi*, Yaracuy, Venezuela, 20 km NW San Felipe (Minas de Aroa), 395 m, 12 Dec 1967, Dec 1947; and 1, ex *P. parnellii*, Sucre, Venezuela, 12 km NE Güiria (Ensenada Cuaranta), 90 m, 17 Jun 1967, Jun and Dec 1967.

Other Records: Reported off *Mormoops megalophylla* (paratypes), Hato, Curaçao (Brennan, 1967:148), and *Pteronotus davyi*, Yucatán Peninsula, México (Loomis, 1969:5).

Remarks: The Venezuela specimens agree closely with the holotype as did the Mexico specimens (according to Loomis, 1969). The palpal claw is reillustrated to indicate differences from the original illustration. In addition, the microtarsala I is correctly placed laterad of tarsala I.

Vercammen-Grandjean, et al. (1973) place *Wagenaaria* as a subgenus of *Chatia* Brennan, 1946, on the basis of the number of branched setae on the femora of the legs (6, 7, 5 for legs I, II, and III).

Genus *Whartonia* Ewing

Whartonia Ewing, 1944:102 [Type species: *Hannemania nudosetosa* Wharton, original designation]; Gould, 1956:19; Chen and Hsu 1959: 549; Wharton and Fuller, 1952:104; Domrow, 1962:1; Vercammen-Grandjean, 1968: 126; Vercammen-Grandjean, et al. 1973:64.

Diagnosis: Larvae with spiracles and tracheae. Cheliceral blades with a row each of large dorsal and ventral teeth. Scutum lacking nasus.

Redescription: Larvae parasitic on bats and occasionally rodents. Cheliceral blades 50-110 μm long, with dorsal and ventral rows of teeth. Palpotibial claws with three to several prongs. Palpal formula variable, B/B/B $\frac{NN}{BB}$; palpal tarsi 7B plus tarsala. Galealae branched. Tracheae and spiracles present. Scutum subrectangular, often much broader than deep. Sensillae flagelliform; nude or sparsely barbed. Genualae and tibialae variable. Tarsala III present or absent; coxa I bisetose; coxa II unisetose. Mastisetae absent. Idiosomal setae with short, barblike setules, sparsely to moderately branched.

Key to Subgenera and Species

1. Coxa III bisetose, parasubterminala on leg I absent, tarsala III present (subgenus *Whartonia*) 2
   Coxa III unisetose, parasubterminala on leg I present, tarsala III lacking, (subgenus *Asolentria*) 4

2(1). Three genualae I, anterolateral angles of scutum acute *W.* (*W.*) *angulascuta* n. sp.
   Two genualae I, anterolateral angles of scutum not acute 3

3(2). Dorsal setae number about 30, with very appressed, short barbs, nearly nude .... *W.* (*W.*) *nudosetosa*

Dorsal setae number about 60, densely barbed; setules thornlike .... *W.* (*W.*) *pachywhartoni*

4(1). Palpotibial claw trifurcate, Palpal formula B/B/BNN, setules of scutal setae short and thornlike .... *W.* (*A.*) *guerrerensis*

Palpotibial claw pectinate, palpal formula B/B/BNB, setules of scutal setae about 8 μm long, slender .... *W.* (*A.*) *womersleyi*

Remarks: Although tracheae and spiracles are reportedly absent in the subgenera *Whartonia* and *Asolentria* (Vercammen-Grandjean, 1968:119), neotropical representatives of these taxa were found to possess both. The spiracles are small and located adjacent to the anterior margin of coxa I. Lack of scutal nasus is therefore not coincident with the absence of spiracles and tracheae in these subgenera.

Subgenus *Whartonia* Vercammen-Grandjean

Whartonia (*Whartonia*) Ewing, 1944:102 [Type species: *Hannemania nudosetosa* Wharton]; Vercammen-Grandjean, et al., 1973:64.

Diagnosis: Larvae with bisetose coxa III, tarsala III, and lacking parasubterminala on leg I.

Description: Larvae large, broad ovoid to circular when engorged. Cheliceral blades about 100 μm long, with large dorsal and ventral teeth. Palpal formula B/B/BBB; galealae branched; palpotibial claws pentafurcate to pectinate. Scutum much wider than deep; sensillae barbed or nude. Coxa III bisetose; tarsala III present; parasubterminala I lacking.

Whartonia (*Whartonia*) *nudosetosa* (Wharton)

Hannemania nudosetosa Wharton 1938:142 [Holotype, larva; ex *Peropteryx canina canina* (=*P. macrotis*) and *Artibeus jamaicensis*, Yucatán, México: Rocky Mountain Laboratory, Hamilton, Montana]; Hoffman 1944: 56; Vercammen-Grandjean 1968:126.

Whartonia nudosetosa: Ewing, 1944:102; Hoffman 1949:189; Wharton and Fuller 1952:104; Brennan and Jones, 1959:11; Chen and Hsu, 1959:555; Brennan and Dalmat, 1960:185; Hoffman, 1960:4; Vercammen-Grandjean, 1968:126.

Diagnosis: *W. nudosetosa* separates from *W. angulascuta* n. sp. by the form and pattern of dorsal setae palpal formula B/B/BNN, and nonacute anterolateral angles of scutum.

Redescription: *Idiosoma*: Nearly circular; length and width of holotype 710 and 620. Eyes 2/2, plate lacking; anterior 11, posterior 10 μm in diameter. Dorsal setae appearing almost nude, with minute nubbins. Dorsal setae 40-50 μm, longer anteriorly; 2 humerals (62 μm)-8-2 (lateral)-6-2 (lateral)-8-6-2. Ventral setae: 2 sternals with long setules (broken in most specimens); 30-34 slender pre- and para-anals 30-40 μm, with long slender setules or stubs of broken setules; and about 16 postanals similar to dorsals. Anus just posterad of third row of setae. Spiracles small, adjacent to anterior margin of coxa I (not visible in holotype). Tracheae visible in some specimens to posterior third of idiosoma. *Gnathosoma*: Cheliceral bases moderately punctate, punctae fine. Palpal formula B/B/BBB, femoral and genual setae slender, with a few branches; dorsotibial much heavier with numerous, very small branches. Galealae sparsely branched. Palpotibial claw pentafurcate. Cheliceral blades about 87 μm (absent on holotype); teeth large and curved, numbering about 21 dorsally and 20 ventrally. *Scutum*: Shaped as figured by Brennan and Dalmat (1960:185, Fig. 3); much broader than deep, subquadrate, with sinuate posterior margins. Sensillae nude; posterior to PL's. Scutal setae similar to dorsals. Measurements of Holotype (measurements of Venezuela specimen in parentheses): AW-138 (130), PW-148 (140), SB-54 (50), ASB-41 (48), PSB-10 (8), AP-22 (22), AMB-13 (11), AM-89 (79), AL-58 (56), PL-67 (67), S– (–). *Legs*: Coxae lightly punctate. Distance between coxa I setae 40. Legs relatively long, not heavily sclerotized. Specialized setae as figured by Brennan and Dalmat (1969:185, Fig. 3). Genuala formula 2+,1,1. Tibiala formula 2+,2,1. Microsetae 3-11 μm long. Branched setae per leg segment, sequentially for legs I, II, and III: Coxa 2,1,2; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus approximately 24,21,24 (33,29,27 on Venezuela specimen). Tarsal claws nude. Leg index 1075.

Distribution: México, West Indies, Trinidad, Colombia, Venezuela, and Guatemala.

Specimens Examined: Holotype and 2 paratypes, ex *Artibeus jamaicensis* and *Peropteryx canina canina*, *[=Peropteryx macrotis]*, Yucatán, México, Aug 1936:1, *Glossophaga soricina*, Sinaloa, México, Jul 1964;1, *Mimon cozumelae*, Yucatán, México, Jul 1962; larvae off 89 Venezuela bats, as follows: 25, ex 6 *Peropteryx kappleri;* 3 ex 1 *Noctilio labialis;* 5, ex 1 *Chrotopterus auritus;* 1 ex *Glossophaga longirostris;* 109, ex 20 *G. soricina;* 28, ex 9 *Lionycteris spurrelli;* 9, ex 4 *Anoura caudifera;* 2, ex 2 *A. geoffroyi;* 6, ex *Anoura* sp. A, 38, ex 11 *Carollia brevicauda;* 68, ex 23 *C. perspicillata;* 2, ex 2 *Sturnira lilium;* 2, ex 1 *Vampyrops aurarius;* 1 ex *Chiroderma villosum;* 1 ex *Artibeus jamaicensis;* 1, ex *Ametrida centurio*; 7, ex 3 *Desmodus rotundus.* Collected throughout the year except Dec and Jan 1966-68, from TF Amazonas, Apure, Barinas, Bolívar, Carabobo, Distrito Federal, Falcón, Mérida, Miranda and Zulia.

Other Records: Recorded off: *Carollia perspicillata azteca,* Alta Vera Paz, Guatemala (Brennan and Damat, 1960:185); Leaf-nosed bat, Jamaica (Brennan, 1953:294); *Carollia perspicillata, Quintana Roo,* and *Artibeus jamaicensis, Desmodus rotundus, Mimon cozumelae,* and *Glossophaga soricina;* Yucatán, México (Loomis, 1969:6); *Nycteris borealis* and unidentified bats, Puebla, México, (Hoffman, 1948: 189); *Desmodus rotundus,* La Fontaine Cave, Trinidad. (Brennan and Jones, 1960:496); and *C. perspicillata,* Tamana Bat Cave, Trinidad (Brennan, 1967:153).

In addition, specimens from Dept. Meta, Colombia, off *Molossus major,* are on deposit in the Rocky Mountain Laboratory, Hamilton, Montana.

Remarks: The presence of 2 coxa III setae, which has not previously been reported, was observed on the holotype as well as on all other specimens studied. Specimens examined indicated a clinal increase in size of the South America specimens over the original specimens from Yucatán, México, to South America, and also showed an increase in the number of setae on the tarsi of the legs. Comparison of the leg index and number of branched setae on the tarsi of legs I, II, and III for specimens from Yucatán, Costa Rica, and Venezuela follows: Yucatán (holotype), leg index 1075, branched setae 24,21,24; Costa Rica, leg index 1280, branched setae 33, 27, 23-24; Venezuela, leg index 1390, branched setae 33, 29, 27. A specimen from Sinaloa, México, collected in 1960, had a leg index of 1080 and approximately 30, 22, 20 branched setae on legs I, II, and III, respectively. Although the type material seen is too poor to accurately count the branched setae of the legs, it is evident that the México material examined has fewer branched tarsal setae than the specimens from Costa Rica and Venezuela. This variation may be contributed to the increase in size as referred to by Vercammen-Grandjean, et al. (1973:54), "Gigantism often favors an increase in the number of barbed setae, predominantly on tarsus and tibia."

Whartonia (Whartonia) pachywhartoni Vercammen-Grandjean

Whartonia pachywhartoni Vercammen-Grandjean, 1966:282 [Holotype, larva; ex *Micronycteris megalotis,* Brazil; U.S. National Museum, Washington, D.C. (See remarks below)].

Diagnosis (based on original description): *W. pachywhartoni* differs from other neotropical *Whartonia* species by the densely barbed dorsal setae and the six-pronged palpotibial claws.

Distribution: Brazil: Lagoa Ltd.

Specimens Examined: None.

Records: Holotype and 5 specimens only; ex *Micronycteris megalotis,* Lagoa Ltd., Brazil, 10 Apr 1962, M. G. Sceva, collector.

Remarks: Specimens of this species could not be located. Apparently the author's shipment of type material to the United States National Museum coincided with the transfer of the U. S. N. M. chigger collection to the Rocky Mountain Laboratory and was misplaced.

Whartonia (Whartonia) angulascuta n. sp.
(Fig. 18)

Type data: Holotype and 3 paratypes, RML #52990, and 1 paratype 52784, ex *Carollia perspicillata,* Venezuela, Falcón, 11 km NE Mirimire, (La Pastora), 250 m, 21 Nov 1967. Ten paratypes: 1, RML#52752, ex *C. brevicauda,* Venezuela, Monagas, 5 km NW Caripe (San Augustín), 1,160 m, 26 Jun 1967; 2, RML#54829, 5, RML#55886, ex *Chrotopterus auritus,* Venezuela, Falcón, 12 km ENE Mirimire (La Pastora), 220 m, 14 Nov 1967; 2, RML#52712, *Diphylla ecaudata,* Venezuela, Monagas, 3 km SW Caripe (Hacienda Tucusito), 854 m, 11 Jul 1967; N. E. Peterson, F. Brown, J. Matson, R. B. and P. B. Peacock, collectors.

Holotype and 5 paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: W. (W.) *angulascuta* n. sp. differs from other Neotropical species by acute anterolateral scutal angles and by numerous genualae on leg III.

Description: *Idiosoma*: Broadly ovoid, length and width of holotype 736 and 435. Eyes 2/2; anterior 20, posterior 17 μm in diameter; plates lacking. Dorsal setae moderately barbed, se-

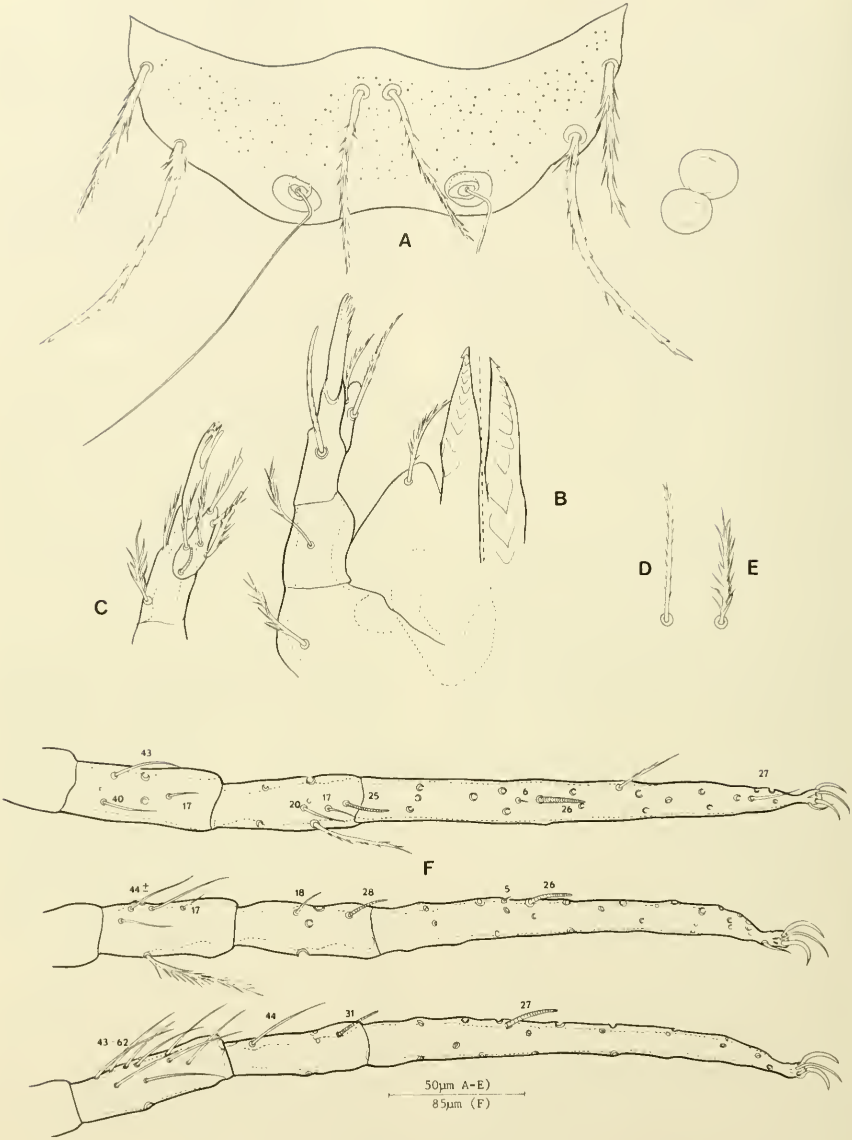

Fig. 18. *Whartonia angulascuta*, new species. A, scutum; B, palpus, dorsal aspect, and cheliceral blade—left, dorsal aspect, right, ventral aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, leg segments showing specialized setae.

tules very short and appressed, appearing as nubbins; humerals 66 μm, others 58-78; arranged approximately 2-11-2-9-2-9-9-6-2 (variable). Ventral setae: 2 sternals; about 40 slender pre-anal and para-anal setae with longer setules 37-60 μm, para-anals longest; plus about 32 postanals similar to dorsal. Anus located at fourth row of ventral setae. Spiracles small; tracheae apparent in less engorged specimens. *Gnathosoma*: Cheliceral bases moderately punctate; palpal formula B/B/BBB, setae long, with few long setules; palpotarsus 7B plus tarsala; galealae sparsely branched; palpotibial claws apparently pentafurcate; cheliceral blades 111 μm long, with about 8 dorsal and 15 ventral teeth. *Scutum*: Shaped as figured; anterolateral angles acute; sensillae nude; bases posterior to PL's. Other scutal setae similar to dorsals, with longer setules. Measurements of holotype: AW-170, PW-146, SB-58, ASB-59, PSB-11, AP-29, AMB-12, AM-67, AL-55+, PL-95, S-131. *Legs*: Long and slender, with little intermedullary space. Specialized setae as figured; parasubterminala absent. Branched setae per leg segment, sequentially for legs I, II, and III: Coxa 2, 1, 2; trochanter 1,1,1; femur 6,6,4; genu 4,4,4; tibia 8,6,6; tarsus about 50-60,56,45. Number of tibialae and genualae variable among specimens.

Distribution: Venezuela: Monagas and Falcón states.

Specimens Examined: Type specimens.

Remarks: The genualae varied from 3 to 4 on leg II and from 7 to 11 on leg III. The distal tibiala III was absent from both legs of 1 specimen, and from 1 leg of 2 specimens. No differences in the number of branched setae were noted on segments where variations in specialized were found. The heavy sclerotization of the legs is similar to that described for *W. pachywhartoni*. The name refers to the acute anterolateral scutal angles.

Subgenus *Asolentria* Vercammen-Grandjean

Whartonia (*Asolentria*) Vercammen-Grandjean, 1968:126 [Type species: *Whartonia trinidadensis* Brennan and Jones, 1960:496, original designation]; Vercammen-Grandjean, et al., 1973:64.

Diagnosis: Larvae separate from the nominate subgenus by unisetose coxa III, parasubterminala on leg I, and absence of tarsala III.

Redescription: Larvae large, parasitic on bats. Idiosoma semicircular when engorged. Cheliceral blades about 50 μm long, with dorsal and ventral teeth, and dorsal, subapical hook. Palpal claws trifurcate to pentafurcate. Palpal formula variable. Galealae branched. Scutum deep, subrectangular; sensillae flagelliform. Tracheae and spiracles present, minute. Coxa III unisetose; subterminala and parasubterminala present on leg I. Tarsala III lacking.

Whartonia (*Asolentria*) *guerrerensis* Hoffman

Whartonia guerrerensis Hoffmann, 1960:5 [Type species: ex *Mormoops megalophylla*, Guerrero, México: Hoffman collection, Ciudad, México]; Brennan, 1967:153; Loomis, 1969:5.

Whartonia trinidadensis Brennan and Jones, 1960:496 [Type species: *Whartonia trinidadensis*, ex *Mormoops megalophylla*, Tamana Cave, Trinidad; Rocky Mountain Laboratory, Hamilton, Montana].

Whartonia (*Asolentria*) *trinidadensis*: Vercammen-Grandjean 1968:126.

Diagnosis: *W. guerrerensis* differs from *W.* (*A.*) *womersleyi* by the trifurcate palpotibial claw and short thornlike barbs on scutal setae.

Redescription (Based on Venezuela specimens. See remarks below): *Idiosoma*: Nearly circular when engorged, length and width of one engorged specimen: 550 and 475. Eyes 2/2 in indistinct plates; anterior 10, posterior 6 μm in diameter. Humerals 54 μm; dorsal setae 44-58 μm longer laterally and posteriorly, sparsely branched, with short thornlike setules. Dorsal formula approximately 2 (humerals) -8-10-4 (lateral) -11-4 (lateral) -13-2-10-6-2-2. Ventral setae: 2 sternals; 30 pre-anals in uneven rows (37-43 μm), the first 3 rows with longer setules; and 28 postanals, similar to dorsals. Spiracles minute, visible in most specimens only as small portion of trachea adjacent to or under anteromedian margin of coxa I. Tracheae traceable for only few micrometers. *Gnathosoma*: Cheliceral blades prominent, about 58 μm long with about 13 large ventral teeth, 8 small dorsal teeth and 1 large dorsolateral subapical tooth. Palpal formula B/B/BNN; femoral and genual setae with 1 or 2 barbs; genual very long and slender; dorsotibial thicker and densely branched with short fine branches. Palpotarsus 7B plus tarsala; setae sparsely barbed, ventral setae usually appearing nude. Galealae with a few inconspicious barbs. *Scutum*: Shape conforms to original illustration. Subrectangular, anterior and posterior margins slightly sinuate; punctae light and sparse. Scutal setae similar to but stouter than dorsals; sensillae with 1 or 2 barbs. Measurements of Venezuela specimen (measurements of holotype in parentheses, according to Hoffman, 1960): AS-81 (78), PW-84 (81), SB-26 (28), ASB-25 (26), PSB-17 (15), AP-30 (28), AM-49 (40), AMB-8 (–), AL-38 (36), PL-53 (46), S-76+ (más de 60). *Legs*: Coxae moderately punctate; all other segments lightly punctate. Specialized setae as originally figured. Genuala formula 2+,1+,1; tibiala formula 2^+,2,1. Branched setae sparsely branched; number per segment listed sequentially for Legs I, II, and III. Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 20,17,15. Leg index 874. Tarsal claws with a pair of onychotriches, apparently easily broken. Empodia nude.

Distribution: Bahamas, Curaçao, Colombia, México, and Venezuela.

Specimens Examined: Eleven larvae from Venezuela; 2 ex *Mormoops megalaphylla*, Sucre, 9 km NE Güiria (Ensenada Cuaranta), 1 m, 5 Jun 1967; 9 ex 3 *M. megalophylla*, 10 km NE Güiria (Río Salado), 90 m, 7 Jun 1967.

Other Records: Holotype and a paratype, ex *Mormoops megalophylla*, Guerrero, México (Hoffman, 1960:7). Also reported off: *Mormoops megalophylla*, Tamana Cave, Trinidad (Brennan and Jones 1960:496); *M. megalophylla*, Hato, Curaçao and Cueva de Quadirikiri, Aruba; *Erophylla sezekorni*, New Province Bahamas; and *Peropteryx macrotis*, Isla Margarita, Venezuela (Brennan, 1967:153). In addition, the Rocky Mountain Laboratory collection includes specimens off *Mormoops megalophylla*, Apr 1967, Macarequa, Colombia.

Remarks: Type material for *W. guerrerensis* was not obtainable at the time of writing. The description of a Venezuela specimen, therefore, was used primarily to enlarge upon the original description. Measurements of the Venezuela specimen are overall larger than those of the holotype. Brennan's description of the synonym, *W. trinidadensis*, also shows some increase in size over the scutal measurements listed by Hoffmann in the original description. A similar increase in size of Venezuela specimens in comparison with Mexico representatives was also noticed in *W. nudosetosa*.

Whartonia (*Asolentria*) *womersleyi* Brennan and Dalmat

Whartonia womersleyi Brennan and Dalmat, 1960:185 [Holotype, larva, ex *Balantiopteryx io*, Guatemala: Field Museum of Natural History].

Diagnosis: *W. womersleyi* differs from other neotropical *Whartonia* species by the pectinate palpal claws and single dorsal teeth on the cheliceral blades.

Redescription: (based on paratypes and original description): *Idiosoma*: Nearly circular. Length and width of one paratype, 924 and 721. Eyes 2/2. Body setae moderately branched, setules barblike. DF approximately: 2 humerals (70 μm) 6-10-2 (lateral) 8-12+24, (62-69 μm). Two sternals, plus about 48 ventral setae; preanals and postanals similar to dorsals (49-66 μm). Spiracles visible only as opening to tracheae, adjacent to anterior margin of coxa I. Tracheae visible only near coxa I. *Gnathosoma*: Cheliceral blades 50 μm, as shown in original description with large dorsal tooth, several small anteroventral teeth, and large ventral teeth posteriorly. Galealae apparently branched. Palpal formula B/B/??? (B/B/BNB, Brennan and Dalmat, 1960); palpotarsi 7B plus tarsala. *Scutum*: Not completely visible on 2 paratypes observed. Shape conforms to original illustrations, nearly quadrate, deep, sparsely punctate, posterior margin broadly rounded. Sensillae branched with few very long slender branches. Scutal setae similar to dorsals, with longer setules. Measurements of one paratype with measurements of holotype in parentheses (from Brennan and Dalmat, 1960). AW-81 (83), PW-87 (88), SB-28 (30), ASB-40 (40), PSB-16 (22), A)-32 (33), AMB-10 (–), AM-77 (72), AL-56 (61), PL-57 (61), S-about 81. *Legs*: Specialized setae as originally figured; sclerotization not obvious. Genuala formula 2,1,1; tibiala formula 2^+,2,1. Parasubterminala I present and may have a few barbs; branched setae not plumose, moderately branched, with long, stiff setules; branched setae per segment, listed sequentially for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; tibia ?,6,6; tarsus 20,15,14. Tarsal claws paired with onychotriches apparent on some claws; empodium nude. Leg index 1113 (paratype).

Distribution: Guatemala and British Honduras.

Specimens Examined: Two paratypes ex *Balantiopteryx io*, Guatemala, Alta Vera Paz, May 1948; 3 ex *B. io*, British Honduras, Cayo District, Jul 1972, E. J. Spieka, collector.

Other Material: Holotype and 1 paratype ex *Balantiopteryx io*, Alta Vera Paz, May 1948. (Brennan and Dalmat, 1960:185).

Remarks: The 2 paratypes studied were in poor condition, making accurate scutal measurements and setal counts difficult. Differences from the original description noted in the paratypes were the presence of onychotriches, slightly different counts of the branched setae on tarsi of the legs, and branched sensillae. The only specimen from British Honduras possessing cheliceral blades showed 8 small dorsal teeth on one blade and 5 on the other in addition to the large subapical tooth.

HOST-PARASITE LIST

Class Reptilia

- Order Squamata
  - *Tropiduras peruvianus*
    - *Odontacarus australis*
  - Unidentified lizard
    - *Odontacarus australis*

Class Aves

- Order Galliformes
  - *Odontaphorus erythrops*
    - *Odontacarus tubercularis*
- Order Cuculiformes
  - *Neomorphis geoffroyi salvini*
    - *Odontacarus tubercularis*
  - Unidentified bird
    - *Odontacarus comosus comosus*
    - *Odontacarus mastigophorus*

Class Mammalia

- Order Marsupiala
  - *Monodelphis brevicaudata*
    - *Odontacarus tubercularis*
  - *Marmosa fuscata*
    - *Odontacarus comosus novemsetus*
    - *O. sunnianae*
    - *O. tubercularis*
  - *Marmosa dryas*
    - *Odontacarus comosus comosus*
    - *O. vanderhammeni*
  - *Marmosa robinsoni*
    - *Odontacarus tubercularis*
  - *Marmosa* sp. A
    - *Odontacarus tubercularis*
  - *Philander opossum*
    - *Odontacarus tubercularis*
  - *Didelphis marsupialis*
    - *Odontacarus sunnianae*
    - *O. tubercularis*
    - *Sasacarus furmani panamensis*
  - *Didelphis opossum* [=*Philander opossum*]
    - *Leeuwenhoekia verduni*
- Order Insectivora
  - *Cryptotis thomasi*
    - *Odontacarus dienteslargus*
- Order Chiroptera
  - *Saccopteryx bilineata*
    - *Odontacarus tubercularis*
  - *Peropteryx macrotis*
    - *Whartonia guerrerensis*
    - *Whartonia nudosetosa*
  - *Peropteryx kappleri*
    - *Whartonia nudosetosa*
  - *Balantiopteryx io*
    - *Whartonia womersleyi*
  - *Noctilio labialis*
    - *Whartonia nudosetosa*
  - *Pteronotus davyi*
    - *Wagenaaria similis*
  - *Pteronotus parnellii*
    - *Wagenaaria similis*
  - *Mormoops megalophylla*
    - *Wagenaaria similis*
    - *Whartonia guerrerensis*
  - *Micronycteris megalotis*
    - *Whartonia pachywhartoni*
  - *Micronycteris microtus*
    - *Odontacarus tubercularis*
  - *Lonchorhina aurita*
    - *Odontacarus schoenesetosus*
    - *O. vergrandi*
  - *Mimon cozumelae*
    - *Whartonia nudosetosa*
  - *Phyllostomus hastatus*
    - *Odontacarus tubercularis*
  - *Chrotopterus auritus*
    - *Whartonia angulascuta*
    - *Whartonia nudosetosa*
  - *Glossophaga longirostris*
    - *Whartonia nudosetosa*
  - *Glossophaga soricina*
    - *Whartonia nudosetosa*
  - *Lionycteris spurrelli*
    - *Whartonia nudosetosa*
  - *Anoura caudifera*
    - *Whartonia nudosetosa*
  - *Anoura geoffroyi*
    - *Whartonia nudosetosa*
  - *Anoura* sp. A
    - *Whartonia nudosetosa*
  - *Carollia brevicauda*
    - *Odontacarus tubercularis*
    - *Whartonia angulascuta*
    - *W. nudosetosa*
  - *Carollia perspicillata*
    - *Whartonia angulascuta*
    - *W. nudosetosa*
  - *Carollia perspicillata azteca*
    - *Whartonia nudosetosa*
  - *Sturnira lilium*
    - *Whartonia nudosetosa*
  - *Vampyrops aurarius*
    - *Whartonia nudosetosa*
  - *Vampyrops helleri*
    - *Odontacarus tubercularis*
  - *Vampyressa pusilla*
    - *Odontacarus tubercularis*
  - *Chiroderma villosum*
    - *Whartonia nudosetosa*
  - *Artibeus jamaicensis*
    - *Odontacarus schoenesetosus*
    - *Whartonia nudosetosa*
  - *Ametrida centurio*
    - *Whartonia nudosetosa*
  - *Erophylla sezekorni*
    - *Whartonia guerrerensis*
  - *Desmodus rotundus*
    - *Whartonia nudosetosa*
  - *Diphylla ecaudata*
    - *Whartonia angulascuta*
  - *Eptesicus montosus*

- *Albeckia albecki*
  - *Odontacarus tubercularis*
- *Lasiurus borealis*
  - *Whartonia nudosetosa*
- *Histiotus* sp. A
  - *Albeckia albecki*
- *Antrozous pallidus pacificus*
  - *Albeckia albecki*
- *Molossus major*
  - *Whartonia nudosetosa*

Order Lagomorpha

- *Sylvilagus floridanus*
  - *Odontacarus tubercularis*
- *Sylvilagus floridanus chiapensis*
  - *Odontacarus mastigophorus*

Order Rodentia

- *Sciurus granatensis*
  - *Odontacarus sunnianae*
  - *O. tubercularis*
- *Liomys adspersus*
  - *Odontacarus tubercularis*
- *Liomys irroratus*
  - *Odontacarus tubercularis*
- *Heteromys anomalus*
  - *Odontacarus comosus novemsetus*
- *Heteromys anomalus anomalus*
  - *Odontacarus tubercularis*
- *Heteromys desmarestianus*
  - *Sasacarus furmani panamensis*
- *Heteromys desmarestianus desmarestianus*
  - *Leeuwenhoekia vercammeni*
- *Heteromys guameri*
  - *Odontacarus tubercularis*
- *Oryzomys albigularis*
  - *Odontacarus comosus comosus*
  - *O. comosus novemsetus*
  - *O. dienteslargus*
  - *O. munchiquensis*
  - *O. vanderhammeni*
  - *O. sunnianae*
  - *O. tiptoni*
  - *O. tubercularis*
- *Oryzomys capito*
  - *Odontacarus tubercularis*
- *Oryzomys concolor*
  - *Odontacarus tubercularis*
- *Oryzomys fulvescens*
  - *Odontacarus tubercularis*
- *Oryzomys minutus*
  - *Odontacarus comosus comosus*
  - *O. pugnosus*
  - *O. tiptoni*
  - *O. tubercularis*
  - *O. tuberculohirsutus*
  - *O. vanderhammeni*
  - *O. vergrandi*
- *Nectomys alfari*
  - *Odontacarus tubercularis*
- *Nectomys squamipes*
  - *Odontacarus tubercularis*
- *Nectomys squamipes melanius*
  - *Odontacarus tubercularis*
- *Rhipidomys venustus*
  - *Odontacarus comosus comosus*
- *Thomasomys cinereiventer*
  - *Odontacarus munchiquensis*
- *Thomasomys hylophilus*
  - *Odontacarus comosus comosus*
  - *O. dienteslargus*
  - *O. tubercularis*
- *Thomasomys laniger*
  - *Odontacarus dienteslargus*
  - *O. pugnosus*
  - *O. schoenesetosus*
  - *O. tuberculohirsutus*
  - *O. vanderhammeni*
  - *O. vergrandi*
- *Thomasomys lugens*
  - *Odontacarus schoenesetosus*
  - *O. pugnosus*
  - *O. tiptoni*
  - *O. tubercularis*
- *Thomasomys vestitus*
  - *Odontacarus schoenesetosus*
  - *O. tiptoni*
- *Chilomys instans*
  - *Odontacarus dienteslargus*
- *Tylomys watsoni*
  - *Sasacarus furmani panamensis*
- *Ototylomys phyllotis*
  - *Odontacarus chiapanensis*
  - *O. tubercularis*
- *Peromyscus truei gratus*
  - *Odontacarus bakeri*
- *Peromyscus guatemalensis*
  - *Odontacarus bakeri*
- *Peromyscus leucopus*
  - *Odontacarus tubercularis*
- *Peromyscus yucatanicus*
  - *Odontacarus chiapanensis*
  - *O. tubercularis*
- *Reithrodontomys* sp.
  - *Odontacarus bakeri*
- *Baiomys musculus musculus*
  - *Sasacarus furmani furmani*
- *Baiomys taylori*
  - *Odontacarus bakeri*
- *Akodon bogotensis*
  - *Odontacarus dienteslargus*
  - *O. tuberculohirsutus*
- *Akodon urichi*
  - *Odontacarus tubercularis*
- *Zygodontomys brevicauda*
  - *Odontacarus tubercularis*
- *Chinchillula sahamae*
  - *Odontacarus kofordi*
- *Punomys lemminus*
  - *Odontacarus kofordi*
- *Neotomys ebriosus*
  - *Odontacarus kofordi*
- *Sigmodon hispidus*
  - *Odontacarus sunnianae*
  - *O. tubercularis*
- *Sigmomys alstoni*
  - *Odontacarus tubercularis*
- Unidentified Wood Rat
  - *Odontacarus mastigophorus*
- *Rattus norvegicus*
  - *Odontacarus tubercularis*
- *Rattus rattus*
  - *Odontacarus tubercularis*
- *Rattus* sp.
  - *Odontacarus tubercularis*
- Unidentified rodent. "Tepeizquinte" (=*Agouti paca*?)
  - *Odontacarus chiapanensis*
- *Agouti paca*
  - *Odontacarus tubercularis*
- *Dasyprocta aguti*
  - *Odontacarus tubercularis*
- *Dasyprocta* sp.
  - *Odontacarus tubercularis*

- *Abrocoma cinerea*
  - *Odontacarus kofordi*
- *Proechimys guyanensis*
  - *Odontacarus tubercularis*
- *Proechimys semispinosus*
  - *Odontacarus chiapanensis*
  - *O. sunnianae*
  - *O. tubercularis*
  - *Sasacarus furmani panamensis*
- *Proechimys semispinosus panamensis*
  - *Sasacarus furmani panamensis*

Order Carnivora

- *Felis pardalis*
  - *Odontacarus tubercularis*

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A LIST OF VENEZUELA CHIGGERS, PARTICULARLY OF SMALL MAMMALIAN HOSTS (ACARINA: TROMBICULIDAE)

by

James M. Brennan[1] and Jack T. Reed[2]

ABSTRACT

Detailed or summarized records of 136 species in 38 genera with a key to the latter are provided. Of 86 described forms, 49 are new for Venezuela; the remaining undescribed taxa are coded for purposes of this report. A classified host-parasite list is appended.

INTRODUCTION

This report derives from a large project, "Ecology and Distribution of Mammalian Ectoparasites, Arboviruses, and their Hosts in Venezuela," supported by a U.S. Army Medical Research and Development Command contract (DA-49-193-MD-2788) with the Smithsonian Institution, directed by Dr. Charles O. Handley, Jr., Smithsonian Institution, and Lt. Col. Vernon J. Tipton, U.S. Army (retired), now Brigham Young University. Collections were made between July 1965 and August 1968.

Specifically, it is based upon an examination of some 20,000 slides and subsequent identification of 130 species of chiggers in 38 genera in Venezuela. Although a synoptic key to genera is provided and an occasional taxonomic comment offered, this is not intended to be a searching, systematic study, but rather an inventory of species, together with pertinent collecting data and abbreviated distributional records outside of Venezuela.

Although many trombiculid species were found, they represent only a fraction of the forms believed to be present. For the most part, chiggers were obtained by a method commonly used for larger ectoparasites—e.g., combing the pelage of freshly killed hosts. The enormous number of mammals to be inspected and the time involved in their preparation unfortunately precluded thorough and intensive examination for larvae occupying intradermal and intranasal niches, as well as other more or less cryptic habitats. Some species are very common and abundant. *Eutrombicula goeldii,* for example, was identified from 4,000 larvae in 600 collections of 60 host species taken from sea level to nearly 3,500 meters in 20 major political divisions. In such cases, collecting data are condensed to a list of host species with generalized locality and seasonal information.

An asterisk immediately preceding a specific name indicates that the species recorded is new to Venezuela fauna. Undescribed species are coded. Descriptions of some of these are in press or in manuscript; others will be described as appropriate. The generic status of 9 species remains to be clarified. These have been recorded in their original genera *sensu lato* and appear at the end of the report. The generic key does not obtain for them.

Involved in the collecting of some 40,000 vertebrates, mostly mammals, and their ectoparasites were N. E. Peterson, M. D. Tuttle, A. L. Tuttle, D. B. Peacock, R. B. Peacock, F. L. Harder, J. O. Matson, F. Brown, and their assistants. Dr. Handley identified the mammalian hosts.

We are most grateful to many persons for assistance in composing this list. Particularly, we thank Alma D. Smith and Bobbi Ann Rockford for the sometimes arduous and ofttimes tedious work of accessioning collected material, preparing and labeling slides, and aiding in summarizing data, and Helen S. Donovan for typing the manuscript. Special thanks are tendered Drs. Tipton and Handley for their enabling role in this project.

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Key to the Venezuela Genera

1.	Leg segmentation 6-6-6, scutum with 6 setae (Leeuwenhoekiinae)	2
	Leg segmentation 7-7-7 or 7-6-6; 3, 4, 5 or 7 setae on scutum	5
2.	Palpal tarsus with 4 branched setae, leg tarsus I without subterminala	*Albeckia*
	Palpal tarsus with 7 branched setae, leg tarsus I with subterminala	3
3.	Scutum with nasus	*Odontacarus*
	Scutum without nasus	4
4.	Cheliceral blade with dorsal and ventral rows of teeth, palpotibial claw with more than 2 prongs, spiracles and tracheae present but minute in *W. guerrerensis*	*Whartonia*
	Cheliceral blade with tricuspid cap only, palpotibial claw bifurcate, spiracles and tracheae absent	*Wagenaaria*
5(1).	Scutum with 2 anterosubmedian setae and a nasus (Apoloniinae)	*Apolonia*
	Scutum with 1 anteromedian seta and no nasus (Trombiculinae)	6
6.	Leg segmentation 7-6-6, sensillae expanded	7
	Leg segmentation 7-7-7, sensillae flagelliform, thickened or considerably expanded	11
7.	Palpal tarsus with 4 branched setae, endoparasitic	*Intercutestrix*
	Palpal tarsus with 5 branched setae	8
8.	Dorsal platelets present, posterolateral setae usually on scutum	*Polylopadium*
	Dorsal platelets absent, posterolateral setae off scutum	9
9.	Laterosternal setae between coxae II and III	*Pseudoschoengastia*
	No laterosternal setae between coxae II and III	10
10.	Scutum wider than long, coxa III with anteroproximal angle, 3 genualae I, 1 pair of humeral setae	*Vanidicus*
	Scutum longer than wide, coxa III without anteroproximal angle, 2 genualae I, 2 pairs of humeral setae	*Anomalaspis*
11.	Palpal tarsus with 4 branched setae, sensillae expanded	12
	Palpal tarsus with more than 4 branched setae, sensillae of various forms	14
12.	Coxa III multisetose, idiosomal setae differentiated, ventral setae extend into sternal area	*Aitkenius*
	Coxa III unisetose, idiosomal setae undifferentiated, ventral setae do not extend into sternal area	13
13.	Mastitarsala III present, genuala II and III absent	Genus A
	Mastitarsala III absent, genuala II and III present	*Quadraseta*
14(11).	Palpal tarsus with 5 branched setae, sensillae expanded	15
	Palpal tarsus with more than 5 branched setae, sensillae of various forms	17
15.	Coxae II and III multisetose, tibiala III absent, palpal tarsus without subterminala, intranasal	*Kymocta*
	Coxae II and III unisetose, tibiala III present, palpal tarsus with subterminala, not intranasal	16
16.	Sensillae somewhat thickened to fusiform, with very long setules, microtarsala I proximad or distad of tarsala I, on bats	*Perissopalla*
	Sensillae broadly expanded, with short setules, microtarsala I always proximad of tarsala I, principally on rodents	*Colicus*
17(14).	Palpal tarsus with 6 branched or 6 branched and nude setae	18
	Palpal tarsus with 7 branched setae	24

18. Tarsi of legs with subapical nude setae, microtarsala II distad of tarsala II, apical half of sensillae densely clothed by broad setules with tapering tips, on bats *Speleocola*
Tarsi without subapical nude setae, microtarsala II proximad of tarsala II, sensillae expanded or flagelliform 19

19. Genualae II and III absent, on bats .... *Loomisia*
Genualae II and III present 20

20. Sensillae expanded asymmetrically .... *Arisocerus*
Sensillae expanded symmetrically or flagelliform 21

21. Palpal tarsal setae branched, leg I without parasubterminala, sensillae flagelliform, scutum with acute posterior angle .... *Boshkerria*
Palpal tarsal setae branched and nude, leg I with parasubterminala, posterior angle of scutum rarely acute 22

22. Sensillae nude flagelliform, palpal tibial claw bifurcate, without mastitarsala III, microsetae of legs peglike, on bats .... *Phalcophila*
Sensillae branched flagelliform or expanded, palpal tibial claw trifurcate or bifurcate, with mastitarsala III, microsetae of legs of usual form 23

23. Anterior margin of scutum angulate, anterolateral setae of scutum marginal, sensillae expanded, cheliceral blade with accessory dorsal tooth .... *Nasicola*
Anterior margin of scutum not angulate, anterolateral setae of scutum submarginal, sensillae branched flagelliform or somewhat expanded, cheliceral blade without accessory dorsal tooth .... *Microtrombicula*

24(17). Palpal tarsus without subterminala, microtarsala I laterad of and nearly contiguous with tarsala I, with mastitibiala III .... *Atelepalme*
Palpal tarsus with subterminala, microtarsala I distad of tarsala I, without mastitibiala III except in some species of *Eutrombicula* 25

25. Sensillae expanded 26
Sensillae flagelliform 27

26. Scutum with pattern of striae on posterior half, cheliceral blade without accessory dorsal tooth, on birds .... *Neoschoengastia*
Scutum without striae, cheliceral blade with accessory dorsal tooth, intranasal on mammals .... *Rhinibius*

27(25). Palpal tibial claw single pronged, a mastitarsala III .... *Crotiscus*
Palpal tibial claw bifurcate or trifurcate, mastitarsala III present or absent 28

28. Scutum with 7 setae .... *Hoffmannina*
Scutum with 5 setae 29

29. Cheliceral blade with subapical series of ventral teeth 30
Cheliceral blade with tricuspid cap 31

30. Cheliceral blade with subapical multiserrate hood, posterior margin of scutum with median tip .... *Beamerella*
Cheliceral blade with few subapical teeth, posterior margin of scutum lacking median tip .... *Hooperella*

31(29). Posterolateral setae off scutum, palpal tibial claw deeply cleft, eyes punctate, anterolateral scutal setae far posterior to margin, on bats .... *Nycterinastes*
Posterolateral setae on scutum, palpal tibial claw trifurcate or bifurcate, eyes impunctate, anterolateral scutal setae may be submarginal but never far posterior 32

32. Palpal tibial claw bifurcate, the accessory prong inner and ventral .... *Eutrombicula*
Palpal tibial claw trifurcate or if bifurcate, the accessory prong outer and dorsal 33

33. Scutum subcordate, projected posteriorly, the widely separated sensillae and setae in anterior third, palpal tibial claw bifurcate .... *Buclypeus*
Scutum and vestiture otherwise, palpal tibial claw bifurcate or trifurcate 34

34. Eyes in scutum .... *Peltoculus*
Eyes not in scutum 35

35. Telofemur III with 4 setae; palpal femoral, genual and tibial setae nude; no mastitarsala III; anterolateral setae of scutum marginal .... *Chiroptella*
Telofemur III with 3 setae, palpal setae otherwise, mastitarsala III present except in some *Parasecia* species, anterolateral setae of scutum submarginal 36

36. Scutum subpentagonal, on birds .... *Blankaartia*
Scutum subrectangular with sinuous margins .... *Parasecia*

Genus *Aitkenius* Brennan, 1970

Type species: *Euschöngastia cunctata* Brennan and Jones, 1961

Aitkenius ciscunctatus Brennan and Reed

Aitkenius ciscunctatus Brennan and Reed, 1973a, p. 532.

No records except those of the original description: 52 larvae off *Zygodontomys brevicauda, Nectomys squamipes,* and *Proechimys semispinosus*, Amazonas.

Aitkenius hystricosus Brennan and Reed

Aitkenius hystricosus Brennan and Reed, 1973a, p. 532.

Described from 1 specimen off *Proechimys semispinosus*, Apure. No further records.

Aitkenius senticosus Brennan and Reed

Aitkenius senticosus Brennan and Reed, 1973a, p. 532.

Known only from material of the original description: 11 larvae off *Oryzomys minutus*, *O. albigularis*, and *Thomasomys hylophilus*, Táchira.

Genus *Albeckia* Vercammen-Grandjean and Watkins, 1966

Type species: *Albeckia albecki* Vercammen-Grandjean and Watkins, 1966

Albeckia albecki Vercammen-Grandjean and Watkins

Albeckia albecki Vercammen-Grandjean and Watkins, 1966, p. 74.

One larva off *Eptesicus montosus*, Distrito Federal, 4 km NNW Caracas (Los Venados), 1559 m, 25 Jul 1965; 7 off *Histiotus* sp. A., D., F., 5 km NNE Caracas (Pico Avila), 2101 m, 23 Aug 1965.

These Venezuela data, as recorded by Reed and Brennan (1975), constitute the only additional records since *A. albecki* was described from 40 larvae off 2 bats (*Antrozous pallidus pacificus*) Solano Co., California.

Genus *Anomalaspis* Brennan, 1952

Type species: *Anomalaspis ambiguus* Brennan, 1952

Anomalaspis ambigua Brennan

Anomalaspis ambiguus Brennan, 1952, p. 143.

Two larvae off *Heteromys anomalus*, Miranda, 33 km WSW Caracas (Alto Ño León), 1962 m, 24 May 1967.

Described from a single larva off *H. anomalus*, Aragua. Brennan (1971) recorded another larva off *H. anomalus*, Distrito Federal, 25 Aug 1965. Despite extensive collecting in Venezuela and elsewhere in the Neotropical region, these data provide the only records of *A. ambigua* in more than 20 years.

Genus *Apolonia* Torres and Braga, 1938

Type species: *Apolonia tigipioensis* Torres and Braga, 1938

**Apolonia tigipioensis* Torres and Braga

Apolonia tigipioensis Torres and Braga, 1938, p. 171.

Ten larvae off *Leptonycteris curasoae*, Falcón, Peninsula de Paraguaná, 25 km SW Pueblo Nuevo (Yabuquiva), 13 m, 17 July 1968; 28 off *Sylvilagus floridanus*, Falcón, Capatárida, 40 m, 20 Jun to 1 Jul 1968; 233 off 28 *S. floridanus*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Moruy), 45-55 m, 11-17 Jul 1968; 6 off *S. floridanus*, Guárico, 16 km NW Barbacoas, 228 m, 2 Mar 1966; 4 off *S. floridanus*, Nueva Esparta, 36 km W Porlamar, 10 m, 30 Jan 1967; 1 off *Mus musculus*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Moruy), 55 m, 15 Jul 1968.

The above are new host and locality records for this peculiar species described from Pernambuco, Brazil, off domestic chicken, where the singly encapsulated larvae produce nodular lesions basally in the quills of developing feathers of chicks. Siqueira (1949) reports a human case involving *A. tigipioensis.*

Genus *Arisocerus* Brennan, 1970

Type species: *Arisocerus amapensis* Brennan, 1970

**Arisocerus amapensis* Brennan

Arisocerus amapensis Brennan, 1970a, p. 32.

One larva off *Proechimys guyannensis*, Bolívar, 45 km NE Icabarú (Santa Lucía de Surukun), 851 m, 15 May 1968.

No other records beyond those of the original description: type series off *Oryzomys macconnelli*, Amapá, Brazil, and numerous larvae off *O. capito* and *Proechimys guyannensis*, northern Brazil; 3 off *O. laticeps* and 1 off *Myoprocta acouchy*, Surinam.

Genus *Atelepalme* Brennan and Reed, 1973

Type species: *Atelepalme smarma* Brennan and Reed, 1973

Atelepalme smarma Brennan and Reed

Atelepalme smarma Brennan and Reed, 1973b, p. 706.

No records other than those of the original description: 6 larvae off *Zygodontomys brevicauda* from Guárico and Bolívar.

Atelepalme sp. A

Six larvae off *Marmosa robinsoni*, 60 off 15 *Sylvilagus floridanus*, and 5 off *Calomys hummelincki*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Moruy), 45-90 m, 8 to 30 Jul 1968.

Genus *Beamerella* Brennan, 1958

Type species: *Beamerella acutascuta* Brennan, 1958

**Beamerella acutascuta* Brennan

Beamerella acutascuta Brennan, 1958, p. 72.

One larva off unidentified lizard, Bolívar, 20 km W La Paragua (Hato San Jose), 298 m, 28 Mar 1967; 2 off *Saccopteryx bilineata*, Amazonas, 163 km ESE Puerto Ayacucho (San Juan), Río Manapiare, 155 m, 21 Jul 1967; 5 off *S. bilineata*, Trujillo, 23 km N Valera (Agua Viva), 164 m, 30 Aug 1965; 2 off *Micronycteris megalotis*, Apure, 46 km NE Puerto Páez (Hato Cariben), Río Cinaruco, 76 m, 14 Dec 1965; 1 off *Mimon crenulatum*, Apure, 29 km SSW Santo Domingo (Nulita), 24 m, 22 Jan 1968; 11 off 2 *Phyllostomus discolor*, Trujillo, 25 km NW Valera (Agua Santa), 90 m, 18-22 Oct 1965; 1 off *P. discolor*, Amazonas, 108 km SSE Esmeralda, Río Mavaca, 140 m, 14 Apr 1967; 4 off *P. discolor*, Miranda, 60 km E Caracas (Birongo), 60 m, 23 Jan 1968; 1 off *Trachops cirrhosus*, Amazonas, 84 km SSE Esmeralda (Boca Mavaca), 138 m, 20 Feb 1966; 12 off *Carollia perspicillata*, Miranda, 1 km S Río Chico, 1 m, 26 Oct 1966; 6 off *Artibeus jamaicensis*, Trujillo, 23 km N Valera (Agua Viva), 164 m, 1 Sep 1965; 1 off *A. jamaicensis*, Trujillo, 25 km NW Valera (Agua Santa), 90 m, 7 Sep 1965; 10 off *A. jamaicensis*, Zulia, 33 km NW La Paz (Nr. Cerro Azul), 75 m, 14 Jun 1968: 1 off *Desmodus rotundus*, Guárico, 10 km NE Altagracia (Hacienda Elvira), 630 m, 16 Sep 1966; 2 off *Molossus ater*, Apure, Puerto Páez, 76 m, 17 Jan 1966.

Described from *Chilonycteris rubiginosa* and *Carollia perspicillata*, Trinidad, this bat chigger has been recorded from *Mimon crenulatum*, *Micronycteris xenoctenes*, and *Saccopteryx* sp., Trinidad (Brennan and Jones, 1960); *Micronycteris megalotis*, *S. bilineata*, and *C. perspicillata*, Panama (Brennan and Yunker, 1966) *Trachops cirrhosus*, Bolivia (Brennan, 1970b).

Beamerella sp. A.

Five larvae off *Molossus aztecus*, Bolívar, 47 km ESE Caicara (Hato La Florida), 50 m, 19 Apr 1967; 1 off *M. sinaloae*, Yaracuy, 10 km NW Urama, 25 m, 8 Mar 1966.

Genus *Blankaartia* Oudemans, 1911

Type species: *Trombidium niloticum* Trägådh, 1905

**Blankaartia sinnamaryi* (Floch and Fauran)

Trombicula (*Trägardula*)! *sinnamaryi* Floch and Fauran, 1956, p. 3.

Six larvae off unidentified bird and owl, Bolívar, 20 km W La Paragua (Hato San Jose), 300 m, 6 Apr 1967; 1 off unidentified bird, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Cerro Santa Ana), 565 m, 1 Aug 1968; 2 off owl, Yaracuy, 20 km NW San Felipe (Minas de Aroa), 395 m, 13 Dec 1967; 15 off 2 capybara (*Hydrochaeris hydrochaeris*), Monagas, 54 km S Maturín (Hato de Bejuco), 18 m, 8 Jun 1968.

The holotype larva of this bird chigger was taken unengorged from flooded plains in French Guiana; 2 others presumably from bird and another off parakeet comprise the "type series." Brennan (1953) recorded the species as *Trombicula* sp. off *Myadestes genibarbis*, Jamaica; many larvae from numerous bird species and a reptile were recorded by Brennan and Jones (1960) from Trinidad, and (1961a) off *Thryothorus genibarbis*, Peru; Brennan and Yunker (1966) identified several hundred larvae from 26 species of birds and a bat in Panama. The only records of the Neotropical *B. sinnamaryi* for the United States are 2 larvae off *Dumetella carolinensis* and 1 off *Hylocichla mustelina*, Cameron Co., Texas (Brennan, 1965).

Genus *Boshkerria* Fauran, 1959

Type species: *Boshkerria tuberculata* Fauran, 1959

**Boshkerria punctata* (Boshell and Kerr)

Trombicula punctata Boshell and Kerr, 1942, p. 15 (reprint).

One larva off *Carollia perspicillata*, Falcón, 14 km ENE Mirimire (La Pastora), 122 m, 11 Nov 1967; 23 off 4 *Heteromys anomalus*, Sucre, 26 km ESE Carúpano (Manacal), 190-575 m, 27 Jul to 1 Aug 1967; 1 off *Zygodontomys brevicauda*, Falcón, 80 km NW Carora (Río Socopo), 480 m, 20 May 1968; 7 off *Z. brevicauda*, Trujillo, 30 km NW Valera (El Dividive), 90 m, 5 Oct 1965; 1 off *Z. brevicauda*, Zulia, 40 km NW La Paz (nr. Cerro Azul), 80 m, 9 Jun 1968; 1 off *Agouti paca*, Monagas, 54 km S Maturín (Hato de Bejuco), 18 m, 9 Jun 1968; 2 off *Proechimys guyannensis*, Amazonas, 163 km ESE Puerto Ayacucho (San Juan, Río Manapiare), 155 m, 11 Jul 1967; 2 off *P. semispinosus*, Falcón, 80 km NW Carora (Río Socopo), 470 m, 23 May 1968; 7 off *P. semispinosus*, Sucre, 26 km ESE Carúpano (Manacal), 26 Jul 1967; 1 off *P. semispinosus*, Trujillo, 48 km WNW Valera (La Ceiba), 27 m, 5 Nov 1965.

Other records since described off *Cuniculus paca*, Colombia, are: 1 larva off *Proechimys guyannensis*, Trinidad (Brennan and Jones, 1960); 1 off *Orozomys keaysi*, Peru (Brennan and Jones, 1961a); 22 off 2 *Hoplomys gymnurus*, Panamá (Brennan and Yunker, 1966); 1 off *Dasyprocta* sp., Surinam (Brennan, 1970a).

Genus *Buclypeus* Brennan, 1972

Type species: *Trombicula ignota* Brennan, 1971

Buclypeus daptops Brennan

Buclypeus daptops Brennan, 1972b, p. 1179.

Described from 13 larvae off 6 *Proechimys guyannensis*, Amazonas.

New records are: 2 off *Proechimys semisponosus*, Amazonas, 68 km SSE Esmeralda (10 km up Río Mavaca from Boca Mavaca), 138 m, 17 Mar 1967; 1 off *P. guyannensis*, same locality and date; 1 off *P. guyannensis* Amazonas, Belén (*Río Cunucunuma*), 150 m, 2 Jan 1967.

Genus *Chiroptella* Vereammen-Grandjean, 1960

Type species: *Trombicula insolli* Philip and Traub, 1950

**Chiroptella* (*Oudemansidium*) *australis* (Brennan)

Leptotrombidium australis Brennan, 1970b, p. 810.

One specimen off *Tadarida gracilis*, Amazonas, 56 km NNW Esmeralda (Belén, Río Cunucunuma), 150 m, 13 Jan 1967.

First record since described from numerous larvae off several bats (*Tadarida laticaudata*) from Rondônia, Brazil.

Genus *Colicus* Brennan, 1970

Type species: *Colicus icomi* Brennan, 1970

**Colicus colombiae* (Boshell and Kerr)

Neoschongastia colombiae (in part), Boshell and Kerr, 1942, p. 16 (reprint).

Ten larvae off *Monodelphis brevicaudata*, Amazonas, 32 km SSE Puerto Ayacucho (Raya), 135 m, 11 Sep 1967; 1 off *Sigmomys alstoni*, Bolívar, 46 km NE Icabarú, 15 May 1968.

Other records since described off *Proechimys chrysaeolus*, Colombia, are: 15 larvae off *Proechimys* sp., *P. chrysaeolus*, *Dasyprocta* sp., and *Myoprocta* sp., Colombia (Brennan, 1970c).

**Colicus johnsoni* (Yunker and Brennan)

Euschoengastia johnsoni Yunker and Brennan, 1964, p. 194.

Ten larvae off *Didelphis marsupialis* and 1 off *Echimys armatus*, Amazonas, 84 km SSE Esmeralda, (Boca Mavaca), 138 m, 17-20 Mar 1967.

Described off *Calomys callosus* and *Pro-*

echimys guyannensis, Bolivia; also recorded by Brennan (1970b) off *Oryzomys capito* and *Proechimys* sp., Bolivian-Brazilian border.

**Colicus pichindensis* (Brennan)

Euschoengastia pichindensis Brennan, 1968a, p. 682.

Three larvae off 2 *Oryzomys albigularis,* Miranda, 3 km NE Caracas (Quebrada Chacaito), 1150-1170 m, 17-18 May 1967; 1 off *O. albigularis,* Aragua, 13 km NW Maracay (Rancho Grande Biology Station), 1050 m, 9 Aug 1965; 1 off *Sigmodon hispidus,* Barinas, Altamira, 697 m, 22 Dec 1967.

First records since described off *Oryzomys caliginosus,* Colombia.

Colicus sp. A

Eight larvae off 3 *Akodon urichi,* Falcón 84 km NW Carora (Cerro Socopo), 1260 m, 13-18 May 1968; 1 off *Oryzomys albigularis,* Miranda, 5 km NNW Guarenas (Curupao), 1160 m, 10 Oct 1966.

Colicus sp. B

Nine larvae off *Dasyprocta fuliginosa,* Amazonas, 163 km ESE Puerto Ayachucho (San Juan, Río Manapiare), 155 m, 7 Jul 1967; 1 off *Monodelphis brevicaudata,* Zulia, 21 km SW Machiques (Kasmera), 270 m, 20 Apr 1968.

Colicus sp. C

Five larvae off *Proechimys guyannensis,* Amazonas, Tamatama, Río Orinoco, 135 m, 21 May 1967; 1 off *P. guyannensis,* Amazonas, 56 km NNW Esmeralda (Belén, Río Cunucunuma), 150 m, 3 Jan 1967.

Genus *Crotiscus* Ewing, 1944

Type species: *Trombicula desdentata* Boshell and Kerr, 1942

Crotiscus desdentatus (Boshell and Kerr)

Trombicula desdentata Boshell and Kerr, 1942, p. 11 (reprint).

About 140 larvae identified from 32 collections. Opossums: 1 *Marmosa fuscata,* 2 *Philander opossum.* Bats: 1 *Vampyrops helleri,* 1 *Vampyressa pusilla,* 1 *Promops nasutus.* Rodents: 1 *Sciurus aestuans,* 2 *S. granatensis,* 2 *Heteromys anomalus,* 2 *Thomasomys lugens,* 5 *Oryzomys albigularis,* 1 *O. minutus,* 1 *Oryzomys* sp., 1 *Nectomys alfari,* 1 *N. squamipes,* 1 *Zygodontomys brevicauda,* 3 *Rattus rattus,* 5 *P. semispinosus,* 1 *Echimys armatus.*

Apure, 24 m, Jan 1968; Aragua, 1050 m, Aug 1965; Carabobo, 1513-1810 m, Nov 1967 and Aug 1968; Falcón, 25-470 m, Oct 1965 and May 1968; Distrito Federal, 1780 m, Dec. 1965; Mérida, 2040-2630 m, Apr and May 1966; Monagas, 1010 m, Jul 1967; Táchira, 2380 m, Mar 1968; Amazonas, 130-1400 m, Feb to Jul 1967; Trujillo, 90-2350 m, Oct 1965 and Jan 1966; Zulia, 37-1135 m, Mar and May 1968.

Numerous specimens of this common Neotropical species, described off *Proechimys chrysaeolus,* Colombia, are recorded also from various mammalian hosts elsewhere in Colombia and Venezuela as well as Trinidad and Panamá (Brennan, 1957 and 1968a, Brennan and Jones, 1960, Brennan and Yunker, 1966).

Crotiscus sp. A

About 650 larvae identified from 116 collections. One bird, unidentified. Opossums: 1 *Marmosa dryas,* 5 *M. impavida,* 1 *M. robinsoni,* 1 *Didelphis azarae,* 2 *Caenolestes obscurus.* Insectivore: 5 *Cryptotis thomasi.* Rodents: 1 *Sciurus granatensis,* 1 *Heteromys anomalus,* 11 *Oryzomys albigularis,* 6 *O. fulvescens,* 31 *O. minutus,* 8 *Rhipidomys venustus,* 37 *Thomasomys hylophilus,* 5 *Akodon bogotensis.*

Guárico, 181 m, Jan 1968; Táchira, 2355-2455 m, Mar 1968; Zulia, 37-54 m, Mar and Apr 1968.

Genus *Eutrombicula* Ewing, 1938

Type species: *Microthrombidium alfreddugesi* Oudemans, 1910

This medically important genus is represented in Venezuela by 22 species, of which 16 are new. Inasmuch as the group has been detailed separately by Brennan and Reed (1974), particulars of collecting data are omitted here.

Eutrombicula alfreddugesi (Oudemans)

Microthrombidium alfreddugesi Oudemans, 1910, p. 84.

More than 600 larvae from 123 collections of reptiles, marsupials, rodents, a lagomorph, and an anteater—taken throughout Venezuela at elevations from sea level to 1100 m, at all seasons.

Eutrombicula batatas (Linnaeus)

Acarus batatas Linnaeus, 1758, p. 617.

More than 800 larvae from 157 collections of marsupials, bats, rodents, lagomorphs, a lizard, and a bird—with much the same distributional pattern as *E. alfreddugesi*.

Eutrombicula cricetivora Brennan and Reed

Eutrombicula cricetivora Brennan and Reed, 1974, p. 700.

Common on cricetid rodents at high elevations, 2200-3400 m, in western Venezuela (Cordillera de Mérida), Jan to Apr.

Eutrombicula goeldii (Oudemans)

Microthrombidium göldii Oudemans, 1910, p. 84.

Taken more commonly and abundantly than any other chigger in Venezuela. About 4,000 larvae from 608 collections including a frog, lizards, birds, numerous marsupials and rodents, bats, a shrew, a tapir, and brocket deer—throughout Venezuela from sea level to over 3500 m at all seasons.

Eutrombicula jenkinsi Brennan and Reed

Eutrombicula jenkinsi Brennan and Reed, 1974, p. 700.

Seven larvae off cricetids, Mérida and Trujillo, 2225-3170 m, Jan and Mar.

Eutrombicula leegoffi Brennan and Reed

Eutrombicula leegoffi Brennan and Reed, 1974, p. 702.

Taken from cricetid rodents and marsupials, Mérida and Trujillo, 2225-3300 m, Jan and Feb.

Eutrombicula longiseta Brennan and Reed

Eutrombicula longiseta Brennan and Reed, 1974, p. 702.

Three larvae off cricetid rodents, Mérida, 2630 m, Apr.

Eutrombicula lukoschusi Brennan and Reed

Eutrombicula lukoschusi Brennan and Reed, 1974, p. 702.

Taken from cricetids and a marsupial, Táchira, 2385 m, Mar.

Eutrombicula marmosa Brennan and Reed

Eutrombicula marmosa Brennan and Reed, 1974, p. 703.

Fifteen larvae off marsupial and cricetid rodent, Distrito Federal, 1750-1975 m, May and Dec.

Eutrombicula nadchatrami Brennan and Reed

Eutrombicula nadchatrami Brennan and Reed, 1974, p. 703.

Five larvae off rodents and bat, Distrito Federal and Trujillo, 90-2165 m, Aug, Oct, and Dec.

Eutrombicula neotropicalis Brennan and Reed

Eutrombicula neotropicalis Brennan and Reed, 1974, p. 704.

Taken principally from cricetid rodents at high elevations, 2350-3300 m, in western Venezuela, Jan to Apr, and Aug.

**Eutrombicula pacae* (Floch and Fauran)

Trombicula (*Eutrombicula*) *pacae* Floch and Fauran, 1957, p. 1.

Eleven larvae off marsupials, a bat, and rodents taken in Amazonas, Miranda, Monagas, Nueva Esparta, Trujillo, and Yaracuy, at elevations from sea level to 2200 m in months of Jan, Feb, Jun, and Oct.

Eutrombicula spipi Brennan and Reed

Eutrombicula spipi Brennan and Reed, 1974, p. 705.

Fairly common on echimyid rodents, also off a marsupial and bat, Amazonas, Bolívar and Monagas, 138-1329 m, Mar, Apr, and Jul.

Eutrombicula tachirae Brennan and Reed

Eutrombicula tachirae Brennan and Reed, 1974, p. 705.

Common on cricetid rodents, Táchira and Trujillo, 2220-2386 m, Jan and Mar.

Eutrombicula tanychaeta Brennan and Reed

Eutrombicula tanychaeta Brennan and Reed, 1974, p. 706.

Three larvae off marsupial, Mérida, 3155 m, Mar.

**Eutrombicula tinami* (Oudemans)

Microthrombidium tinami Oudemans, 1910, p. 84.

Nineteen larvae off marsupials and rodents from Guárico and Bolívar, 150 to 335 m, Jan and Apr.

Eutrombicula tropica (Ewing)

Trombicula irritans var. *tropica* Ewing, 1925, p. 258.

Over 200 larvae from 54 collections of lizards, marsupials, rodents, a bat, and a monkey—throughout much of Venezuela (12 states) from sea level to 1100 m, at all seasons.

Eutrombicula vacillata Brennan and Reed

Eutrombicula vacillata Brennan and Reed, 1974, p. 707.

Five larvae off marsupial, Mérida, 3265 m, Feb.

Eutrombicula variabilis Brennan and Reed

Eutrombicula nadchatrami Brennan and Reed, 1974, p. 707.

From rodents, shrews, and bats, Apure and Mérida, 75-2040 m, Jan, May, and Dec.

Eutrombicula venezuelensis Brennan and Reed

Eutrombicula venezuelensis Brennan and Reed, 1974, p. 707.

Fifteen larvae off cricetid rodents, Mérida, 3150-3430 m, Mar.

Eutrombicula webbi Brennan and Reed

Eutrombicula webbi Brennan and Reed, 1974, p. 708.

Numerous larvae, principally off cricetid rodents in western Venezuela (Cordillera de Mérida), 90-3200 m, Jan to May, and Oct.

Eutrombicula wolfenbargeri Brennan and Reed

Eutrombicula wolfenbargeri Brennan and Reed, 1974, p. 709.

Taken principally from shrew, also opossum and cricetids, Mérida, 3155-3545 m, Mar.

Genus *Hoffmannina* Brennan and Jones, 1959

Type species: *Novotrombicula suriana* Hoffmann, 1954

Hoffmannina reedi Brennan

Hoffmannina reedi Brennan, 1972a, p. 16.

This species was described from Trujillo, Venezuela, off *Marmosa fuscata* and *Thomasomys laniger.* New Venezuela records are: 2 larvae off *Oryzomys minutus*, Trujillo, 15 km E Trujillo (Hacienda Misisí), 2360 m, 29 Jan 1966; 10 off 3 *Thomasomys lugens*, 14 km E Trujillo (Hacienda Misisí), 2210-2225 m, 27 and 29 Jan 1966; 2 off *T. lugens*, Mérida, 6 km SE Tabay, 2590 m, 11 Apr 1966.

Hoffmannina sp. A

One larva off *Neoplatymops mattogrossensis*, Bolívar, 28 km SE Manteco (Los Patos), 150 m, 11 Apr 1966; 7 off 3 *Cryptotis thomasi*, Mérida, 8 km SE Tabay (La Coromoto), 3160-3175 m, 13-21 Mar 1966; 4 off 2 *C. thomasi*, 10 km SE Tabay (Laguna Verde), 3533-3545 m, 20-21 Mar 1966; 3 off 3 *Oryzomys minutus*, 9-10 km SE Tabay (La Coromoto), 3310-3410 m, 15-18 Mar 1966; 5 off 5 *T. laniger*, 7 km SE Tabay (La Coromoto), 3170-3185 m, 11-15 Mar 1966; 1 off *Dasyprocta* sp., Carabobo, 2 km ENE Montalbán (Hacienda Montero), 598 m, 6 Nov 1967.

Hoffmannina sp. B

Nine larvae off *Rhipidomys macconnelli*, Amazonas, 50 km NNW Esmeralda (Cerro Duida, Caño Culebra), 825 m, 19 Jan 1967; 2 off *Daptomys venezuelae*, Amazonas, 32 km NW Esmeralda (Cerro Duida, Cabecera del Caño Negro), 1400 m, 15 Feb 1967.

Genus *Hooperella* Vercammen-Grandjean, 1967

Type species: *Tecomatlana* (*Hooperella*) *spinirostra* Vercammen-Grandjean, 1967

**Hooperella saccopteryx* (Brennan and Jones)

Trombicula saccopteryx Brennan and Jones, 1960, p. 530.

Some 900 larvae identified from 107 lots. Bats: 86 *Saccopteryx bilineata*, 2 *S. leptura*, 2 *Saccopteryx* sp., 1 *Cormura brevirostris*, 5 *Peropteryx kappleri*, 4 *P. macrotis*, 1 *Mimon crenulatum*, 1 *Carollia brevicauda*, 1 *Desmodus rotundus*, 1 *Molossus ater*. Rodents: 1 *Sigmomys alstoni*, 1 *Rattus rattus*, 2 *Proechimys guyannensis.*

Apure, 76 m, Feb 1966; Bolívar, 150 m, Apr 1966 and 1967; Carabobo, 701-1537 m, Jan 1966 and Nov 1967; Falcón, 2-140 m, Sep 1965 and Nov 1967; Amazonas, 135-155 m, Jan to Oct 1967; Miranda, 1-730 m, Jan, Sep, and Nov, 1966, Jan 1968; Sucre, 1-200 m, Jun and Jul 1967; Trujillo, 90-164 m, Aug and Sep 1965; Yaracuy, 2-395 m, Sep and Nov 1965, Dec 1967; Zulia, 75-80 m, Jun 1968.

This bat chigger, described from numerous larvae off *Saccopteryx bilineata* and 1 off *Desmodus rotundus*, Trinidad, has been commonly recorded off *S. bilineata* in Peru, Surinam, Panamá, and Yucatán (Brennan, 1970a, Brennan and Jones, 1961a, Brennan and Yunker, 1966, Loomis, 1969), and a single larva off *Peropteryx macrotis*, Bolivia (Brennan, 1970b). New records: 25 larvae off *Saccopteryx bilineata*, Guatemala, Alta Verapaz, Chinaja, 180 m, 27 Feb 1960, J. Knox Jones; 9 off *S. bilineata* and 10 off *Rhynchonycteris naso*, Colombia, Antioquia, Chigorodo, Río León, 6 Apr 1966, C. J. Marinkelle.

°*Hooperella vesperuginis* (Brennan and Jones)

Trombicula vesperuginis Brennan and Jones, 1960, p. 533.

About 760 larvae identified from 155 collections. One bird, unidentified. Opossum: 1 *Marmosa robinsoni.* Bats: 3 *Saccopteryx bilineata,* 7 *Peropteryx kappleri,* 2 *Pteronotus parnellii,* 1 *Micronycteris hirsuta,* 2 *M. megalotis,* 3 *M. microtis,* 1 *M. nicefori,* 3 *Phyllostomus discolor,* 5 *P. elongatus,* 1 *P. hastatus,* 1 *Phylloderma stenops,* 2 *Trachops cirrhosus,* 7 *Chrotopterus auritus,* 1 *Glossophaga longirostris,* 8 *G. soricina,* 1 *Lionycteris spurrelli,* 1 *Carollia brevicauda,* 57 *C. perspicillata,* 1 *Sturnira erythromos,* 1 *S. tildae,* 1 *Chiroderma villosum,* 17 *Artibeus jamaicensis,* 18 *Desmodus rotundus,* 4 *Molossus ater.* Rodent: 1 *Echimys armatus.*

Apure, 24 m, Jan and Feb 1968; Barinas, 620 m, Dec 1967; Bolívar, 50-1032 m, Mar to Jun 1966, Mar to May 1967, May 1968; Carabobo, 701-1810 m, Nov 1967; Distrito Federal, 380-1524 m, Jul 1965, Aug 1966, Jul 1967; Falcón, 25-230 m, Oct and Nov 1965, and Nov 1967; Guárico, 181-630 m, Sep 1966, Jan 1968; Miranda, 0-1160 m, Jan 1968, Oct and Nov 1966; Monagas, 854 m, Jul 1967; Sucre, 0-575 m, Dec 1966, Jun to Nov 1967; Amazonas, 135-155 m, Mar to Oct 1967; Trujillo, 90-164 m, Aug to Oct 1965; Yaracuy, 2-25 m, Sep to Nov 1965; Zulia, 24-1135 m, Mar to Jun 1968.

H. vesperuginis, another common bat chigger, exhibiting less host preference than *H. saccopteryx,* was also described from Trinidad, holotype off *Artibeus jamaicensis,* numerous larvae off *Desmodus rotundus,* and several off *Carollia perspicillata, Micronycteris hirsuta, M. megalotis, Vampyrum spectrum* and *Saccopteryx bilineata.* Recorded also from Bolivia off *C. subrufa, D. rotundus,* and *Trachops cirrhosus* (Brennan, 1970b); Panamá off *C. perspicillata, Glossophaga soricina,* and *V. spectrum* (Brennan and Yunker, 1966); Trinidad off *C. perspicillata* (Brennan, 1967); Yucatán off *Artibeus jamaicensis* (Lommis, 1969).

Genus *Intercutestrix* Brennan and Yunker, 1966

Type species: Euschöngastia tryssa Brennan and Jones, 1961

Intercutestrix exigua Brennan and Reed

Intercutestrix exigua Brennan and Reed, 1974, p. 187.

No further records than those of the original description: off *Proechimys semispinosus,* Barinas, and *Sigmodon hispidus,* Carabobo.

Intercutestrix mondolfii Brennan and Yunker

Intercutestrix mondolfii Brennan and Yunker, 1969, p. 299.

Recorded by Brennan and Yunker (1969) from Venezuela: 48 larvae off 7 *Proechimys guyannensis,* Bolívar. No other records.

Intercutestrix pisinna Brennan and Reed

Intercutestrix pisinna Brennan and Reed, 1974, p. 187.

Known only from the original description: 2 larvae off *Proechimys guyannensis,* Amazonas.

Genus *Kymocta* Yunker and Brennan, 1962

Type species: Doloisia (*Kymocta*) *teratarsalis* Yunker and Brennan, 1962

Kymocta faitkeni Brennan

Kymocta faitkeni Brennan, 1968b, p. 614.

This species, described from northern Brazil off *Oryzomys capito,* was first reported in Venezuela by Brennan and Yunker (1969) off *Monodelphis brevicaudata* and *Rhipidomys* sp., Bolívar, and later by Brennan and van Bronswijk (1973) off *Rhipidomys macconnelli,* Amazonas. No additional records.

Kymocta inca (Brennan and Jones)

Doloisia inca Brennan and Jones, 1961a, p. 177.

Described from Peru off *Oryzomys keaysi.* Venezuela records are those of Brennan and Yunker (1969): off *Neacomys tenuipes, Sigmomys alstoni* and *Rhipidomys* sp., Bolívar, also Brennan and van Bronswijk (1973): from Amazonas off *Rhipidomys macconnelli* and *Akodon urichi.*

Kymocta zulia Brennan and van Bronswijk

Kymocta zulia Brennan and van Bronswijk, 1973, p. 451.

No records other than those of the original description: 37 larvae off 4 *Heteromys anomalus,* Zulia.

Genus *Loomisia* Brennan and Reed, 1972

Type species: Euschongastia desmodus Brennan and Dalmat, 1960

Loomisia alcithoae Brennan and Reed

Loomisia alcithoae Brennan and Reed, 1972a, p. 797.

This species was based only on the type series of 3 larvae off *Carollia brevicauda,* Barinas. An additional record is 1 larva off *C. perspicillata*, Trujillo, 19 km N Valera (nr. Agua Viva), 164 m, 6 Oct 1965.

Loomisia bulbocalcar Brennan and Reed

Loomisia bulbocalcar Brennan and Reed, 1972a, p. 798.

No records other than those of the original description: 96 larvae off bats, *Peropteryx kappleri* and *P. macrotis*, and 3 off opossum, *Monodelphis brevicaudata*, from Carabobo and Yaracuy.

Loomisia desmodus (Brennan and Dalmat)

Euschongastia desmodus Brennan and Dalmat, 1960, p. 188.

Venezuela data reported by Brennan and Reed (1972a) and additional records are summarized: 182 larvae from 68 bats of 15 species including *Anoura* sp., *Carollia brevicauda*, *C. perspicillata*, *Chrotopterus auritus*, *Desmodus rotundus*, *Glossophaga longirostris*, *G. soricina*, *Lonchophylla robusta*, *Micronycteris megalotis*, *Peropteryx kappleri*, *P. macrotis*, *Saccopteryx bilineata*, *Sturnira lilium*, *Trachops cirrhosus*, *Vampyressa pusilla*, and 1 larva off unidentified bird.

Apure, 24 m, 23-25 Jan 1968; Aragua, 1100 m, 7 Aug 1965; Barinas, 609-794 m, 13 Dec 1967 to 10 Jan 1968; Bolívar, 150-306 m, 30 Mar 1966 and 10 Apr 1967; Carabobo, 598-1537 m, 1-29 Nov 1967; Falcón, 2-1260 m, 27 Sep to 23 Nov 1967, 17 May 1968; Guárico, 470 m, 20 Sep 1966; Miranda 1-1160 m, 4-24 Oct 1966; Monagas, 854 m, 11 Jul 1967; Sucre, 90 m, 17-27 Jun 1967; Amazonas, 60-135 m, 11 May to 23 Nov 1967; Trujillo, 90-164 m, 1-6 Sep 1965; Yaracuy, 150-400 m, 7 Dec 1967; Zulia, 270-1135 m, 18 Apr to 4 May 1968.

L. desmodus, described from Guatemala off *Desmodus rotundus*, has been recorded off *Carollia perspicillata*, Trinidad (Brennan and Jones, 1960); off *Saccopteryx bilineata*, *Glossophaga soricina*, *Carollia castenea*, *C. subrufa*, and *Micronycteris megalotis*, Panamá (Brennan and Yunker, 1966); off *Erophylla sezekorni*, Bahamas (Brennan, 1967); off *G. soricina* and *Mimon cozumelae*, Yucatan (Loomis, 1969).

Loomisia yunkeri Brennan and Reed

Loomisia yunkeri Brennan and Reed, 1972a, p. 798

No records except those of the original description, here with corrected host identifications: type series off *Peropteryx macrotis*; 96 larvae off bats, *Peropteryx macrotis*, *P. trinitatis*, *Carollia perspicillata*, *Cormura brevirostris*, and *Glossophaga longirostris*, from Barinas, Bolívar, and Falcón.

Genus *Microtrombicula* Ewing, 1950

Type species: *Microthrombidium minutissimum* Oudemans, 1910

*_Microtrombicula boneti_ (Hoffmann)

Trombicula (*Trombicula*) *boneti* Hoffmann, 1952, p. 87.

One larva off *Pteronotus parnellii*, Miranda, Birongo, 60 m, 22 Jan 1968; 2 off *Anoura caudifera*, Carabobo, 4 km NW Montalbán (La Copa), 1537 m, 26 Nov 1967; 1 off *Carollia perspicillata*, Falcón, 14 km ENE Mirimire (La Pastora), 60 m, 23 Nov 1967; 9 off *Desmodus rotundus*, Zulia, 21 km SW Machiques (Kasmera), 270 m, 20 Apr 1968.

Described from Mexico off *Mormoops megalophylla*. Webb and Loomis (1971) report this bat chigger from Costa Rica off *Desmodus rotundus*; from Mexico off *D. rotundus*, *Natalus stramineus*, *Leptonycteris sanborni*, *Glossophaga soricina*, *Mormoops megalophylla*, and *Pteronotus parnellii*; from Texas off *M. megalophylla*. Recorded as *Trombicula tibbettsi* from: *Myotis grisescens*, Alabama, *M. megalophylla*, Texas, *M. tumidiceps* and *Chilonycteris rubiginosa*, Trinidad (Brennan and White, 1960); *C. rubiginosa* and *M. megalophylla*, Trinidad (Brennan and Jones, 1960); *M. megalophylla*, Texas (Loomis and Crossley, 1963); *Pteronotus suapurensis*, Panamá (Brennan and Yunker, 1966); *Erophylla sezekorni*, Bahamas, and *Glossophaga elongata*, Curaçao (Brennan, 1967).

*_Microtrombicula carmenae_ (Brennan and Jones)

Trombicula carmenae Brennan and Jones, 1960, p. 513.

Three larvae off *Phyllostomus discolor*, Trujillo, 25 km NW Valera (Agua Santa), 90 m, 22 Oct 1965; 1 off *Carollia perspicillata*, Bolívar, 50 km SE El Manteco (Río Supamo), 150 m, 7 Apr 1966; 2 off 2 *Sturnira lilium*, Falcón, 84 km NW Carora (Cerro Socopo), 1260 m, 17 May 1968; 10 off *S. lilium*, Monagas, 3 km NW Caripe, 1345 m, 11 Jul 1967; 1 off *S. ludovici*, Guárico, 10 km NE Altagracia (Hacienda Elvira), 630 m, 16 Sep 1966; 1 off *Artibeus harti*, Distrito Federal, 4 km NNW Caracas (Los Venados), 1400 m, 1 Aug 1965; 3 off 2 *A. jamaicensis*, Falcón, 80 km NW Carora (Rio Socopo), 480 m, 20-22 May 1968; 3 off *A. jamaicensis*, Trujillo, 25 km NW Valera (Agua Santa), 90 m, 6 Sep 1965; 1 off *A. jamaicensis*, Yaracuy, 20 km NW San Felipe (Minas de Aroa), 395 m, 18 Dec 1967; 12 off 3 *A. jamaicensis*, Zulia, 19 km WSW Machiques (Novito), 1135 m, 3 and 4 May 1968; 3 off *A. jamaicensis*, Zulia, 33 km NW La Paz (nr. Cerro Azul), 13 Jun 1968; 1 off *Rhipidomys venezuelae*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Cerro Santa Ana), 570 m, 27 Jul 1968.

This bat chigger was described off *Phyllostomus discolor*, Trinidad. Additional records are: Panamá, off *P. hastatus*, *Sturnira ludovici*, and *Artibeus jamaicensis* (Brennan and Yunker, 1966); Costa Rica, off *P. discolor*, *S. ludovici*, *S. mordax*, *A. jamaicensis*, and *A. lituratus;* Nicaragua, off *P. discolor*, *A. jamaicensis*, and *Desmodus rotundus;* Mexico, off *A. jamaicensis;* Trinidad, off *D. rotundus* (Webb and Loomis, 1971).

°*Microtrombicula fragibarba* (Brennan and Jones)

Trombicula fragibarba Brennan and Jones, 1960, p. 517.

One larva off unidentified bird, Bolívar, 20 km W La Paragua (Hato San José), 300 m, 4 Apr 1967; 164 off 19 *Marmosa robinsoni*, Guárico, 35 km SSW San Juan de los Morros (Hato las Palmitas), 181 m, 5-7 Jan 1968; 10 off *M. robinsoni*, Gúarico, 9 km SE Calabozo (Biological Station), 100 m, 19 Aug 1968; 14 off 2 *M. robinsoni*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Moruy), 90 m, 5 and 13 Jul 1968; 8 off *Didelphis marsupialis*, Falcón, 14 km ENE Mirimire (La Pastora), 130 m, 20 Nov 1967; 19 off 2 *Rhipidomys venezuelae*, Falcón, Peninsula de Paraguaná, 25 km SW Pueblo Nuevo (Yabuquiva), 13 m, 17 Jul 1968; 9 off *R. venezuelae*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Cerro Santa Ana), 575 m, 1 Aug 1968; 6 off 2 *R. fulviventer*, Monagas, 5 km NW Caripe (San Agustín), 1170-1185 m, 26 and 28 Jun 1967.

Described from type series off parrot, *Amazona amazonica*, and other material off climbing mouse, *Rhipidomys couesi*, Trinidad. Other records: Surinam, off *Didelphis marsupialis* and *Philander opossum* (Brennan and Lukoschus, 1971).

°*Microtrombicula tragulata* (Brennan and Jones)

Euschöngastia tragulata Brennan and Jones, 1961b, p. 110.

Two larvae off *Marmosa robinsoni*, Guárico, 35 km SSW San Juan de los Morros (Hato las Palmitas), 181 m, 5 Jan 1968; 9 off *Rattus rattus*, Trujillo, 30 km NW Valera (El Dividive), 90 m, 20 Oct 1965; 13 off 2 *Potos flavus*, Distrito Federal, 31 km WSW Caracas (Alto Ño León), 1750 m, 21 Dec 1965; 10 off *P. flavus*, Zulia, 33 km NW La Paz (nr. Cerro Azul), 80 m, 16 Jun 1968.

Described from Barro Colorado Island, Canal Zone, off *Nasua narica;* recorded elsewhere in the Canal Zone off *Didelphis marsupialis* and *Coendou rothschildi* (Brennan and Yunker, 1966); Baja California Sur, Mexico, off *Bassariscus astutus;* Nicaragua, off *Potos flavus* (Webb and Loomis, 1970).

Microtrombicula sp. A

Two larvae off 2 *Artibeus jamaicensis*, Zulia, 33 km NW La Paz (nr. Cerro Azul), 75 m, 13 and 15 Jun 1968.

Microtrombicula sp. B

Five larvae off *Rattus rattus*, Trujillo, 30 km NW Valera (El Dividive), 90 m, 20 Oct 1965; 7 off 2 *Potos flavus*, Distrito Federal, 31 km WSW Caracas (Alto Ño León), 1750 m, 21 Dec 1965.

Microtrombicula sp. C

Seventeen larvae off 4 *Neoplatymops mattogrossensis*, Amazonas, 33 km S Puerto Ayacucho (El Raudal), 195 m, 4 and 10 Oct 1967, 20 km S Puerto Ayacucho (Las Queseras), 135 m, 27 Sep 1967; 1 off *Carollia perspicillata*, Falcón, 11 km ENE Mirimire (La Pastora), 250 m, 21 Nov 1967.

Microtrombicula sp. D

Two larvae off unidentified bird, Bolívar, 20 km W La Paragua (Hato San José), 300 m, 4 Apr 1967.

Genus *Nasicola* Brennan and Yunker, 1969

Type species: *Nasicola annereauxi* Brennan and Yunker, 1969

Nasicola annereauxi Brennan and Yunker

Nasicola annereauxi Brennan and Yunker, 1969, p. 301.

One larva off *Marmosa robinsoni*, Falcón, Capatárida, 40 m, 25 Jun 1968; 1 off *Phyllostomus hastatus*, Falcón, 80 km NW Carora (Rio Socopo), 480 m, 20 May 1968; 44 off 11 *P. hastatus* and 1 off *Molossops planirostris*, Monagas, 54 km SE Maturín (Hato de Bejuco), 18 m, 3-11 Jun 1968.

This intranasal chigger of bats was described from 2 specimens off *Phyllostomus hastatus*, Bolívar, Venezuela. It was found commonly in the nasal passages of *Noctilio labialis* in Surinam (Brennan and Lukoschus, 1971) and is here recorded from Colómbia: 1 larva off *P. hastatus*, Valle, Cali, 2 Aug 1967; 1 off *N. labialis*, Caqueta, Tres Esquinas, 24 May 1968; 1 off *N. labialis*, Caqueta, Los Alicangaros, 24 May 1968; C. J. Marinkelle.

Genus *Neoschoengastia* Ewing, 1929

Type species: *Schöngastia americana* Hirst, 1921

**Neoschoengastia americana* (Hirst)

Schöngastia americana Hirst, 1921, p. 37.

Six larvae off unidentified bird, Bolívar, 20 km W La Paragua (Hato San José), 300 m, 8 Apr 1967; 1 off "owl," same location, 6 Apr 1967; 4 off unidentified bird, Bolívar, 47 km ESE Caicara (Hato La Florida), 50 m, 4 May 1967; 29 off 4 *Zygodontomys brevicauda*, Bolívar, 44-45 km ESE Caicara (Hato La Florida), 43-45 m, 22 to 28 Apr 1967; 1 off *Sylvilagus floridanus*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Moruy), 55 m, 15 Jul 1968.

N. americana was described from Texas off domestic chicken. It is commonly parasitic on both domestic and wild birds and known also from a few reptiles, lagomorphs, and rodents. The species, in its various forms, is widely distributed, particularly in the temperate to warmer climates of the world.

Genus *Nycterinastes* Brennan and Reed, 1973

Type species: *Nycterinastes primus* Brennan and Reed, 1973

Nycterinastes primus Brennan and Reed

Nycterinastes primus Brennan and Reed, 1973b, p. 709.

No records beyond those of the original description: off bats, *Desmodus rotundus, Lionycteris spurrelli, Glossophaga soricina, Anoura geoffroyi, Carollia perspicillata, Lonchorhina aurita, Pteronotus parnellii,* and *Anoura* sp. A, from Bolívar and Amazonas.

Nycterinastes secundus Brennan and Reed

Nycterinastes secundus Brennan and Reed, 1973b, p. 709.

Venezuela records are those of the original description: 21 larvae off 5 *Anoura geoffroyi* from Barinas, Bolívar, and Miranda.

Known also in Costa Rica: 2 larvae off *Anoura geoffroyi*, Cartago, Hacienda Moravia (Moravia de Chirripo), 2 Oct 1962, Casebeer and Arnold; 1 off *Lonchophylla robusta*, Alajueda, 13 mi N Arena das Grutas del Venado, 9 Apr 1963, Casebeer. These records from material collected under direction of Dr. Richard B. Loomis, California State University, Long Beach.

Genus *Odontacarus* Ewing, 1929

Type species: *Trombicula dentata* Ewing, 1925

Odontacarus (*O.*) *australis* (Ewing)

Trombicula australis Ewing, 1929, p. 10

Reed and Brennan (1975) record 12 larvae off 5 unidentified lizards, Zulia, 34 km NNE Paraquaipoa (Cojoro), 15 m, 19 Jun 1968.

Known previously only from the single type specimen off *Tropiduras peruvianus*, Lima, Peru.

Odontacarus (*O.*) *comosus comosus* Reed and Brennan

Odontacarus (*O.*) *comosus comosus*, Reed and Brennan, 1975, p. 13

No records other than those of the type series and additional records listed with the original description:

1 larva off *Marmosa dryas*, 1 off *M. impavida*, 1 off *Oryzomys albigularis*, 3 off 2 *O. minutus*, 2 off *Rhipidomys venustus*, 32 off 14 *Thomasomys hylophilus*, and 2 off unidentified bird, from Táchira.

Odontacarus (*O.*) *comosus novemsetus* Reed and Brennan

Odontacarus (*O.*) *comosus novemsetus*, Reed and Brennan, 1975, p. 13

No records other than those of the original description: 1 larva off *Marmosa fuscata*, 1 off *Heteromys anomalus*, and 15 off *Oryzomys albigularis*, from Distrito Federal and Miranda.

Odontacarus (*O.*) *dienteslargus* Reed and Brennan

Odontacarus (*O.*) *dienteslargus*, Reed and Brennan, 1975, p. 15

No records other than those of the type series and additional records listed with the original description: 3 larvae off *Cryptotis thomasi*, 2 off *Oryzomys albigularis*, 23 off *Thomasomys hylophilus*, 4 off *T. laniger*, 1 off *Chilomys instans* and 2 off *Akodon bogotensis*, from Mérida and Táchira.

Odontacarus (*O.*) *pugnosus* Reed and Brennan

Odontacarus (*O.*) *pugnosus*, Reed and Brennan, 1975, p. 15

No records other than those of the original description: 7 larvae off *Oryzomys minutus* and 3 off *Thomasomys laniger*, from Mérida.

Odontacarus (*O.*) *schoenesetosus* Reed and Brennan

Odontacarus (*O.*) *schoenesetosus*, Reed and Brennan, 1975, p. 17

No records other than those of the original description: 11 larvae off *Lonchorina aurita*, 1 off *Artibeus jamaicensis*, 9 off *Thomasomys laniger*, 7 off *T. lugens* and 2 off *T. vestitus*, from Trujillo.

Odontacarus (*O.*) *sunnianae* Reed and Brennan

Odontacarus (*O.*) *sunnianae*, Reed and Brennan, 1975, p. 19

No records other than the type series and additional records listed with the original description: 1 larva off *Didelphis marsupialis*, 1 off *M. fuscata*, 1 off *Sciurus granatensis*, 2 off *O. albigularis*, 2 off *Sigmodon hispidus*, and 27 off *Proechimys semispinosus* from Aragua, Barinas, Falcón, Lara, and Miranda.

Odontacarus (*O.*) *tiptoni* Reed and Brennan

Odontacarus (*O.*) *tiptoni*, Reed and Brennan, 1975, p. 20

No records other than those of the original description: 1 off *Marmosa dryas*, 1 off *Oryzomys albigularis*, 1 off *O. minutus*, 1 off *Thomasomys lugens*, and 17 off *T. vestitus*, from Trujillo.

Odontacarus (*O.*) *tubercularis* (Brennan)

Acomatacarus tubercularis Brennan, 1952, p. 146.

About 1200 larvae identified from 214 collections, also briefly recorded by Reed and Brennan (1975). Opossums: 4 *Monodelphis brevicaudata*, 1 *Marmosa* sp. A, 13 *M. fuscata*, 13 *M. robinsoni*, 10 *Didelphis marsupialis*. Bats: 1 *Saccopteryx bilineata*, 1 *Micronycteris microtis*, 1 *Carollia brevicauda*, 1 *Vampyrops helleri*, 1 *Vampyressa pusilla*. Lagomorphs: 1 *Sylvilagus floridanus*. Rodents: 1 *Sciurus granatensis*, 40 *Heteromys anomalus*, 40 *Oryzomys albigularis*, 3 *O. concolor*, 1 *O. fulvescens*, 2 *O. minutus*, 1 *Nectomys alfari*, 1 *Thomasomys lugens*, 3 *Akodon urichi*, 8 *Zygodontomys brevicauda*, 28 *Sigmodon hispidus*, 9 *Sigmomys alstoni*, 1 *Rattus norvegicus*, 1 *R. rattus*, 3 *Agouti paca*, 2 *Dasyprocta aguti*, 22 *Proechimys semispinosus*, 1 *Mazama americana*.

Amazonas, 119-145 m, Oct 1967; Aragua, 1050-1100 m, Aug 1965 and Apr 1967; Bolívar, 43-298 m, Jun 1966 and Apr 1967; Carabobo, 25-1537 m, Mar 1966 and Nov 1967; Falcón, 25-1280 m, Oct and Nov 1965, Aug, Nov, and Dec 1967, and May 1968; Distrito Federal, 1415-2181 m, Jul to Dec 1965, Aug 1966, and May to Nov 1967; Guárico, 100-680 m, Sep and Oct 1966, and Jan, May, and Aug 1968; Lara, 1-900 m, Jul 1968; Miranda 1130-2124 m, Sep and Dec 1965, Aug to Oct 1966, May 1967, and May 1968; Monagas, 35-1270 m, Aug 1966, Jun and Jul 1967; Nueva Esparta, 38-100 m, Jan 1967; Sucre, 200-430 m, Jul and Aug 1967; Táchira, 2405-2420 m, Mar 1968; Trujillo, 90-2225, Oct 1965 and Jan 1966; Zulia, 37-1135 m, Mar to Jun 1968.

Described from Aragua, Venezuela, off *Heteromys anomalus*. Reported further by Brennan and Jones (1960) from Trinidad off *Proechimys guyannensis* and *Nectomys squamipes;* by Brennan (1967) from Patos Island, Venezuela, off *Rattus* sp.; by Brennan (1970a) and Brennan and Lukoschus (1971) from Surinam off *Dasyprocta* sp., *Philander opossum*, *Proechimys guyannensis*, and *Nectomys squamipes*.

Recorded by Brennan (1959) as *Odontacarus cayolargoensis* from Key Largo, Florida, off *Sigmodon hispidus;* from Cameron Co., Texas, by Loomis and Crossley (1963) off *Liomys irroratus*, *Peromyscus leucopus*, and *Sigmodon hispidus;* by Loomis (1969) from Mexico off *Heteromys gaumeri* (Campeche) and *Ototylomys phyllotis*, *Peromyscus yucatanicus*, *Sigmodon hispidus*, and *Heteromys gaumeri* (Yucatán). Also recorded as *Odontacarus fieldi* off various birds and mammals in Panamá by Brennan and Jones (1961b) and Brennan and Yunker (1966).

Odontacarus (*O.*) *tuberculohirsutus* Reed and Brennan

Odontacarus (*O.*) *tuberculohirsutus*, Reed and Brennan, 1975, p. 22

No records other than those of the type series and additional records listed with the original description: 10 larvae off *Oryzomys minutus*, 41 off *Thomasomys laniger* and 3 off *Akodon bogotensis*, from Mérida.

Odontacarus (*O.*) *vanderhammeni* Reed and Brennan

Odontacarus (*O.*) *vanderhammeni*, Reed and Brennan, 1975, p. 24

No records other than those of the original description: 1 larva off *Marmosa dryas*, 1 off *Oryzomys albigularis*, 3 off *O. minutus*, and 2 off *Thomasomys lugens*, from Mérida and Trujillo.

Odontacarus (*O.*) *vergrandi* Reed and Brennan

Odontacarus (*O.*) *vergrandi*, Reed and Brennan, 1975, p. 25

No records other than those of the original description: 4 larvae off *Lonchorhina aurita*, 4 off *Oryzomys minutus*, and 11 off *Thomasomys laniger*, from Mérida and Trujillo.

Genus *Parasecia* Loomis, 1966

Type species: *Trombicula gurneyi* Ewing, 1937

**Parasecia* aitkeni Brennan and Jones

Trombicula aitkeni Brennan and Jones, 1960, p. 510.

Nearly 700 larvae identified from 110 collections: 41 *Marmosa robinsoni*, 1 *Saccopteryx bilineata*, 1 *Artibeus lituratus*, 4 *Heteromys* sp. A, 1 *Histiotus* sp. A, 5 *Rhipidomys venezuelae*, 2 *Sigmodon hispidus*, 1 *Sigmomys alstoni*, 1 *Dasyprocta variegata*, 1 *Echimys armatus*, 1 *E. semivillosus*, 49 *Proechimys semispinosus*, 1 *Agouti paca*.

Apure, 24 m, Jan and Feb 1968; Barinas, Dec 1967; Bolívar, 800 m, May 1968; Falcón, 470-615 m, May to Aug 1968; Distrito Federal, 2101 m, Aug 1965; Lara, 518 m, Jul 1968; Zulia, 37-273 m, Feb to Jun 1968.

Described from Trinidad off *Nectomys squamipes* and later recorded off *Marmosa* sp. from the same island (Brennan, 1969a); also reported from Bolivia off *Oryzomys capito* by Brennan (1970b) and by Brennan and Lukoschus (1971) off *Philander opossum*, Surinam.

**Parasecia longicalcar* Brennan and Jones

Trombicula longicalcar Brennan and Jones 1960, p. 517.

Three larvae off 3 *Saccopteryx bilineata*, Falcón, 19 km NW Urama, 25 m, 8 Nov 1965; 1 off *Rhipidomys venezuelae* and 9 off 3 *Zygodontomys brevicauda*, Falcón, 80 km NW Carora (Hacienda Socopito), 470 m, 20, 22, and 28 May 1968; 3 off *Proechimys semispinosus*, Miranda, 6 km SSE Río Chico (Puerto Tuy), 1 m, 15 Nov 1966; 7 off *P. semispinosus*, Yaracuy, 19 km NW Urama, 25 m, 12 Nov 1965.

Holotype off *Amazon amazonica* Trinidad. Recorded also from a variety of tree-frequenting hosts including parrots, snakes, opossums, bats, squirrels, and porcupines in Trinidad, British Guiana, and Panamá (Brennan and Jones, 1960; Brennan and Yunker, 1966; Brennan, 1967 and 1969a).

**Parasecia manueli* Brennan and Jones

Trombicula manueli Brennan and Jones, 1960, p. 520.

Over 200 larvae identified from 38 collections. Two unidentified birds. Opossum: 1 *Philander opossum*. Bats: 1 *Mimon crenulatum*, 2 *Carollia perspicillata*, and 2 *Neoplatymops mattogrossensis*. Rodents: 8 *Heteromys anomalus*, 1 *Rhipidomys leucodactylus*, 3 *Akodon urichi*, 6 *Zygodontomys brevicauda*, 2 *Sigmomys alstoni*, 1 *Agouti paca*, 1 *Proechimys guyannensis*, 9 *P. semispinosus*, and 1 *Echimys armatus*.

Amazonas, 135-195 m, Mar, May, Sep, and Oct 1967; Apure, 24 m, Jan 1968; Bolívar, 851 m, Apr and May 1968; Carabobo, 25 m, 11 to 22 Mar 1968; Monagas, 1180 m, Jun 1967; Sucre, 0-575 m, Dec 1966, Jul and Aug 1967; Zulia, 37 and 80 m, Mar and Jun 1968.

Described from Trinidad off *Zygodontomys brevicauda*. Other records (Brennan and Jones, 1960 and 1961a; Brennan and Yunker, 1966; Brennan, 1968a; Brennan and Lukoschus, 1971) from numerous reptiles, birds, marsupials, and rodents; Trinidad, Peru, Panamá, Colómbia, and Surinam.

**Parasecia psittaci* (Floch and Abonnenc)

Trombicula psittaci Floch and Abonnenc, 1949, p. 1.

Six larvae off 2 unidentified birds, Bolívar 20 km W La Paragua (Hato San José), 300 m, 3 and 4 April 1967.

Described off "perroquet vert," French Guiana. Other records: Brennan and Jones (1960), off *Amazona amazonica*, Trinidad: Fauran (1960), off toucan (*Selenidera* sp.), French Guiana.

**Parasecia soucouyanti* (Brennan and Yunker)

Trombicula soucouyanti Brennan and Yunker, 1966, p. 256.

Two larvae off *Rhipidomys venustus*, Distrito Federal, 5 km NNE Caracas (Pico Avila), 2135 m, 8 Sep 1965.

In addition, known only from the type series off *Sturnira ludovici* and other material off *Myotis* sp., Panamá.

Parasecia sp. A

Thirty-three off 4 *Tadarida gracilis*, Apure, 38 km NNW Puerto Páez, Río Cinaruco, 76 m, 26 to 27 Jan 1966; 2 off 2 *T. gracilis,* Apure, 1 km W Puerto Páez (Cerro de Murciélagos), 76 m, 20 and 21 Jan 1966; 51 off 6 *T. gracilis,* Amazonas, 56 km NNW Esmeralda (Belén), 150 m, 13 Jan 1967; 1 off *T. gracilis,* Bolívar, 50 km SE Manteco, (Río Supamo), 150 m, 8 Apr 1966; 45 off 6 *Neoplatymops mattogrossensis,* Amazonas, 33 km S Puerto Ayacucho (El Raudal), 195 m, 4 and 10 Oct 1967; 1 off *Molossus ater,* Monagas, 5 km NW Caripe (San Agustín), 1180 m, 27 Jun 1967; 6 off *Proechimys semispinosus,* Amazonas, 84 km SSE Esmeralda (Boca Mavaca), 138 m, 20 Mar 1967.

Parasecia sp. C

Seventeen larvae off 2 *Proechimys semispinosus,* Barinas, Altamira, 794 m, 5 Jan 1968.

Parasecia sp. D

Five larvae off *Lonchophylla robusta,* Barinas, 7 km NNE Altamira (Agua Fría), 1070 m, 25 Dec 1967; 5 off *L. robusta,* Barinas, Altamira, 794 m, 20 Dec 1967.

Parasecia sp. E

Eight larvae off 2 *Tadarida gracilis,* Apure, 1 km W Puerto Páez (Cerro de Murciélagos), 76 m, 20 and 21 Jan 1966; 6 off *T. gracilis,* Apure, 38 km NNW Puerto Páez (Río Cinaruco), 76 m, 27 Jan 1966.

Parasecia sp. F

Ten larvae off 1 *Sturnira erythromos,* 12 km SE La Azulita (La Carborera), 2150 m, 21 Apr 1966.

Parasecia sp. G

Eight larvae off *Sturnira erythromos* and 2 off *Artibeus harti,* Distrito Federal, 5 km NNE Caracas (Pico Avila), 2092 and 2150 m, 17 and 20 Aug 1965; 10 off *S. erythromos,* Carabobo, 4 km NW Montalbán (La Copa), 1537 m, 30 Nov 1967.

Parasecia sp. H

Two larvae off unidentified lizard, Bolívar, 20 km W La Paragua (Hato San José), 306 m, 22 Mar 1967; 1 off *Sigmomys alstoni,* Bolívar, 46 km NE Icabarú, 800 m, 15 May 1968.

Parasecia sp. I

Five larvae off 3 *Tadarida gracilis,* Apure, 1 km W Puerto Páez (Cerro de Murciélagos), 76 m, 20 Jan 1966; 11 off 1 *Neoplatymops mattogrossensis,* Bolívar, 28 km SE El Manteco (Los Patos), 150 m, 11 Apr 1966.

Genus *Perissopalla* Brennan and White, 1960

Type species: Perissopalla flagellisetula Brennan and White, 1960

**Perissopalla precaria* Brennan and Dalmat

Euschöngastia precaria Brennan and Dalmat, 1960, p. 190.

About 400 larvae identified from 88 collections. One *Anoura* sp. A, 1 *Artibeus lituratus,* 27 *Carollia brevicauda,* 40 *C. perspicillata,* 1 *Desmodus rotundus,* 1 *Glossophaga longirostris,* 3 *G. soricina,* 1 *Leptonycteris curasoae,* 1 *Micronycteris microtis,* 1 *Noctilio labialis,* 5 *Peropteryx kappleri,* 2 *P. macrotis,* 1 *Phyllostomus discolor,* 2 *Sturnira lilium;* 1 *Proechimys guyannensis.*

Amazonas, 155 m, Jul 1967; Apure, 24 m, Jan 1968; Barinas, 611-794 m, Dec 1967 and Jan 1968; Bolívar, 45-851 m, Jun 1966, Apr 1967 and 1968; Carabobo, 598-1537 m, Nov 1967; Distrito Federal, 1415-1465 m, Jul and Aug 1965; Falcón, 120-1260 m, Nov 1967, May and Jul 1968; Miranda, 1-1160 m, Jan and Oct 1966; Monagas, 854 m, Jul 1967; Sucre, 1 m, Dec 1966; Yaracuy, 400 m, Dec 1967; Zulia, 24-270 m, Mar and Apr 1968.

This bat chigger, described from Guatemala off *Desmodus rotundus* and unidentified bat, was recorded by Brennan and Yunker (1966) off *Micronycteris megalotis,* Panamá, and by Loomis (1969) off *Glossophaga soricina,* Mexico (Quintana Roo).

Perissopalla tanycera Brennan

Perissopalla tanycera Brennan, 1969c, p. 430.

Eighteen larvae off 3 *Peropteryx macrotis* and 2 off *P. trinitatis,* Bolívar, 85 km SSE El Dorado, 374 m, 29 May and 23 Jun 1966; 1 off *Chiroderma trinitatum,* Bolívar, 59 km SE El Dorado (El Manaco), 150 m, 23 Jun 1966.

No other records since described off *Peropteryx* sp. from Bolívar, Venezuela. Brennan (1970b) lists specimens "near *P. tanycera*" off *Peropteryx macrotis,* Beni, Bolivia, and *Saccopteryx bilineata,* Rondônia, Brazil.

Perissopalla sp. A

Four larvae off *Carollia brevicauda,* Aragua, 13 km NW Maracay (Rancho Grande Biological Station), 1100 m, 7 Aug 1965; 16 off 5 *C.*

brevicauda, Carabobo, 4 km NW Montalbán (La Copa), 1737 m, 26 to 30 Nov 1967; 53 off 14 *C. brevicauda,* Barinas, Altamira and 5 km SW Altamira (La Soledad and La Bellaca), 794 m, 13 and 14 December 1967; 12 off 2 *C. brevicauda,* 7 km NNE Altamira (Agua Fría), 1070 m, 25 Dec 1967; 2 off *C. brevicauda* and 1 off *Sturnira lilium,* 2 km SW Altamira (La Vega del Río Santo), 620 m, 27 and 28 Dec 1967; 5 off *Peropteryx kappleri,* Falcón, 12 km ENE Mirimire (La Pastora), 220 m, 14 Nov 1967; 1 off *P. macrotis,* Yaracuy, 20 km NW San Felipe (Minas de Aroa), 395 m, 12 Dec 1967; 19 off 3 *C. brevicauda,* Falcón, 84 km NW Carora (Cerro Socopo), 1260 m, 13 and 17 May, 1968.

Perissopalla sp. B

Three larvae off *Carollia brevicauda* and 3 off *C. perspicillata,* Miranda, 5 km NNW Guarenas (Curupao), 1160 m, 5 and 8 Oct 1966; 32 off 6 *Peropteryx kappleri* and 7 off *C. perspicillata,* Monagas, 3 km SW Caripe (Hacienda Tucusito), 854 m, 11 Jul 1967; 1 off *C. perspicillata,* Sucre, 26 km ESE Carúpano (Manacal), 300 m, 19 Jul 1967; 2 off *C. brevicauda,* Carabobo, 4 km NM Montalbán (La Copa), 1537 m, 27 Nov 1967.

Perissopalla sp. C

Six larvae off *Eptesicus fuscus,* Distrito Federal, 4 km NNW Caracas (Los Venados), 1498 m, 31 Jul 1965.

Perissopalla sp. D

Seven larvae off *Glossophaga soricina,* Bolívar, 56 km SE El Dorado (El Manaco), 150 m, 16 Jun 1966.

Perissopalla sp. E

Eight larvae off *Carollia perspicillata,* Bolívar, 45 km NE Icabarú (Santa Lucía de Surukún), 851 m, 30 Apr 1968; 4 off *C. perspicillata,* Apure, 29 km SSW Santo Domingo (Nulita), 24 m, 28 Jan 1968.

Perissopalla sp. F

One larva off *Carollia perspicillata,* Miranda, 1 km S Río Chico, 1 m, 26 Oct 1966; 1 off Anoura geoffroyi, Bolívar, 59 km SE El Dorado (El Manaco), 150 m, 23 Jun 1966.

Genus *Peltoculus* Brennan, 1972

Type species: *Trombicula almae* Brennan, 1968.

Peltoculus bobbiannae Brennan

Peltoculus bobbiannae Brennan, 1972a, p. 16.

Described from 5 larvae off *Thomasomys hylophilus* and *Oryzomys minutus,* Táchira, about 41 km SW San Cristóbal (Buena Vista), 2350-2430 m.

Additional records from the same general locality are: 2 larvae off *Caenolestes obscurus,* 8 Mar 1968; 16 off 2 *Cryptotis thomasi,* 8 and 15 Mar; 4 off 2 *Akodon bogotensis,* 17 and 18 Mar; 5 off 3 *Oryzomys albigularis,* 16-21 Mar; 14 off 7 *O. minutus,* 2-17 Mar; 15 off 10 Thomasomys *hylophilus,* 1-24 Mar; 20 off 2 *Chilomys instans,* 9 and 13 Mar; 2 off *Rhipidomys venustus,* 9 Mar.

Genus *Phalcophila* Brennan and Reed, 1973

Type species: *Phalcophila antica* Brennan and Reed, 1973.

Phalcophila antica Brennan and Reed

Phalcophila antica Brennan and Reed, 1973b, p. 708.

Known only from the original description: 7 larvae off *Pteronotus psilotis,* Bolívar.

Phalcophila postica Brennan and Reed

Phalcophila postica Brennan and Reed, 1973b, p. 709.

Known only from the holotype off *Pteronotus psilotis,* Bolívar.

Genus *Polylopadium* Brennan and Jones, 1961

Type species: *Polylopadium kramisi* Brennan and Jones, 1961

**Polylopadium aspasium* Brennan

Polylopadium aspasium Brennan, 1969b, p. 868.

One larva off *Proechimys* sp., Amazonas, 106 km SW Esmeralda, (SW bank of Casiquiare Canal, 1 km from Capibara), 130 m, 10 Jun 1967.

Described from 15 larvae off 3 *Oryzomys capito,* Amapá and Pará, Brazil; also recorded from 3 larvae off 2 *Proechimys* sp., Rondônia, Brazil (Brennan, 1970b).

Polylopadium chaetolecanium Brennan and Reed

Polylopadium chaetolecanium Brennan and Reed, 1972b, p. 461.

No records beyond those of the original description: 4 larvae off *Proechimys guyannensis* and *Heteromys anomalus,* Sucre.

Polylopadium tricholeccanium Brennan and Reed

Polylopadium tricholeccanium Brennan and Reed, 1972b, p. 461.

Known only from the single specimen of the original description: off *Proechimys* sp., Falcón.

Genus *Pseudoschoengastia* Lipovsky, 1951

Type species: *Pseudoschoengastia hungerfordi* Lipovsky, 1951

**Pseudoschoengastia bulbifera* Brennan

Pseudoschoengastia bulbifera Brennan, 1960, p. 483.

Nine larvae off *Proechimys semispinosus*, 1 off *Nectomys squamipes*, and 4 off *Heteromys anomalus*, Zulia, 21 km SW Machiques (Kasmera), 270 m, 17 to 22 Apr 1968; 3 off *Sigmodon hispidus*, 19 km WSW Machiques (Novito), 27 Apr 1968; C. E. Yunker.

First records for Venezuela and first bona fide record of genus *Pseudoschoengastia* for South America.

Genus *Quadraseta* Brennan, 1970

Type species: *Euschoengastia pazca* Brennan and Jones, 1964

**Quadraseta antillarum* (Brennan)

Euschoengastia antillarum Brennan, 1967, p. 150.

Nine larvae off *Marmosa robinsoni*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Moruy), 90 m, 13 Jul 1968; 15 off 6 *M. robinsoni*, Guárico, 35 km SSW San Juan de Los Morros (Hato Las Palmitas), 181 m, 3-6 Jan 1968; 54 off 11 *Sylvilagus floridanus*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Moruy), 45-55 m, 13-17 Jul 1968; 26 off 5 *Zygodontomys brevicauda*, Guárico, 35 km SSW San Juan de Los Morros (Hato Las Palmitas), 181 m, 3-6 Jan 1968; 9 off 3 *Z. brevicauda*, Bolívar, 44-47 km ESE Ciacara (Hato La Florida), 45-90 m, 28 Apr 1967; 5 off 2 *Proechimys semispinosus*, Guárico, 35 km SSW San Juan de Los Morros (Hato Las Palmitas), 181 m, 5 and 6 Jan 1968.

Described from 7 larvae off *Sylvilagus floridanus*, Curaçao, Mar 1949; 7 more specimens from same host species and locality, 1963.

**Quadraseta flochi* Brennan and Jones

Euschöngastia flochi Brennan and Jones, 1960, p. 503.

Nearly 200 larvae identified from 8 *Monodelphis brevicaudata*, 3 *Marmosa robinsoni*, 6 *Heteromys anomalus*, 5 *Oryzomys albigularis*, 1 *O. capito*, 1 *Akodon urichi*, 16 *Zygodontomys brevicauda*, 1 *Sigmomys alstoni*, 1 *Sigmodon hispidus*, and 4 *Proechimys semispinosus*.

Bolívar, 150 m, 25 Jun 1966; Amazonas, 135 m, 3-5 Nov 1966; Falcón, 25-1257 m, 19 Oct to 4 Nov 1965; 16 Nov 1967 and 15 May 1968; Distrito Federal, 398 m, 19 Aug 1966; Guárico, 181 m, 5-6 Jan 1968; Miranda, 1130-1176 m, 14 May 1967, 14 and 15 May 1968; Monagas, 18-1340 m, 29 Jun to 8 Jul 1967, 4 and 5 Jun 1968; Sucre, 190-423 m, 21 Jul to 1 Aug 1967; Trujillo, 90 m, 21 Aug to 20 Oct 1965; Zulia, 272 m, 20 Apr 1968.

Quadraseta flochi was described from Trinidad, the type series off *Rattus rattus*, and other material off birds, *Dendrocincla fuliginosa*, *Pitangus sulfuratus*; and mammals, *Didelphis marsupialis*, *Akodon urichi*, *Heteromys anomalus*, *Nectomys squamipes*, *Oryzomys laticeps*, *Zygodontomys brevicauda*, and unidentified rat; other records: off *Thomasomys fuscatus*, Colómbia (Brennan 1968a); and off *Proechimys guyannensis*, Surinam (Brennan and Lukoschus, 1971).

Quadraseta sp. A

Two larvae off 2 *Oryzomys albigularis*, Táchira, 41 km SW San Cristóbal (Buena Vista), 2400 m, 18 and 24 Mar 1968; 1 off *O. capito*, Yaracuy, 20 km NW San Felipe (Minas de Aroa), 404 m, 8 Dec 1967; 9 off 4 *O. minutus*, 1 off *O. fulvescens*, 1 off *Thomasomys hylophilus* and 40 off 6 *Akodon bogotensis*, Táchira, 41 km SW San Cristóbal (Buena Vista), 2370-2420 m, 2-17 Mar 1968.

Quadraseta sp. B

Eighteen larvae off 3 *Akodon urichi* and 9 off *Proechimys semispinosus*, Falcón, 84 km NW Carora (Cerro Socopo), 1262 m, 13 and 14 May 1968.

Quadraseta sp. C

Twenty larvae off 2 *Monodelphis brevicaudata*, Falcón; 14 km ENE Mirimire (La Pastora), 122-160 m, 13 and 19 Nov 1967; 8 off *M. brevicaudata*, Sucre, 26 km ESE Carúpano (Manacal), 417 m, 22 Jul 1967; 1 off *M. brevicaudata*, Trujillo, 23 km NNW Valera (Río Motatan), 90 m, 5 Sep 1965; 9 off 2 *M. brevicaudata*, Trujillo, 19 km N Valera (Agua Viva), 164 m, 5-8 Sep 1965; 3 off *M. brevicaudata*, Guárico, 15 km NW Altagracia (Guatopo National Park), 680 m, 24 Sep 1966; 10 off 2 *M. brevicaudata*, Yaracuy, 20 km NW San Felipe

(Minas de Aroa), 403-425 m, 7 and 8 Dec 1967; 1 off *Marmosa robinsoni*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Cerro Santa Ana), 520 m, 25 Jul 1968; 2 off *Didelphis marsupialis*, Falcón, 14 km ENE Mirimire (La Pastora), 130 m, 20 Nov 1967; 26 off 3 *D. marsupialis*, Miranda, 3 km NE Caracas (Quebrada Chacaito), 1130-1160 m, 14 and 15 May 1967; 1 off *Artibeus lituratus*, Trujillo, 25 km NW Valera (Agua Santa), 90 m, 21 Aug 1965; 2 off *Heteromys anomalus*, Falcón, 14 km ENE Mirimire (La Pastora), 150 m, 13 Nov 1967; 8 off *H. anomalus*, Miranda, 3 km NE Caracas (Quebrada Chacaito), 1130 m, 18 May 1967; 12 off 2 *H. anomalus*, Sucre, 26 km ESE Carúpano (Manacal), 425-575 m, 20 and 27 Jul 1967; 1 off *Oryzomys albigularis*, Miranda, 5 km NNE Caracas (Pico Avila), 2104 m, 23 Aug 1965; 1 off *O. albigularis*, Distrito Federal, 31 km WSW Caracas (Alto Ño León), 23 Dec 1965; 25 off 5 *O. albigularis*, Miranda, 3 km NE Caracas (Quebrada Chacaito), 1130-1175 m, 14-18 May 1967; 1 off *Rhipidomys venezuelae*, Distrito Federal, 4 km NNW Caracas (Los Venados) 1470 m, 29 Jul 1965; 1 off *Zygodontomys brevicauda*, Sucre, 21 km E Cumaná, 20 m, 16 Dec 1966; 1 off *Z. brevicauda*, Nueva Esparta, 3 km NE La Asunción, 420 m, 28 Jan 1967; 1 off *Zygodontomys brevicauda*, Falcón, 14 km ENE Mirimire (La Pastora), 90 m, 15 Nov 1967; 4 off 2 *Proechimys guyannensis*, Bolívar, 44 km ESE Caicara (Hato La Florida), 45 m, 25 Apr 1967; 1 off *P. semispinosus*, Sucre, 25 km ESE Carúpano (Manacal), 190 m, 19 Jul 1967; 1 off *P. semispinosus*, Falcón, 19 km NW Urama, 19 Oct 1965; 3 off 2 *P. semispinosus*, Zulia, 21 km SW Machiques (Kasmera), 270 m, 20 Apr 1968; 1 off *Myotis larensis*, Falcón, Capatárida, 40 m, 27 Jun 1968.

Quadraseta sp. D

Six larvae off *Marmosa robinsoni*, Falcón, Peninsula de Paraguaná, 15 km SSW Pueblo Nuevo (Cerro Santa Ana), 520 m, 25 Jul 1968.

Genus *Rhinibius* Brennan and Yunker, 1969

Type species: *Rhinibius tamandua* Brennan and Yunker, 1969.

Rhinibius tamandua Brennan and Yunker

Rhinibius tamandua Brennan and Yunker, 1969, p. 304.

This intranasal species was described from the type series off *Tamandua tetradactyla*, Pará, Brazil, and 1 larva off *Rhipidomys* sp., Bolívar, Venezuela.

A new record is: 9 larvae off *Tamandua longicaudata*, Monagas, 54 km S Maturín (Hato de Bejuco), 18 m, 6 Jun 1968.

Genus *Speleocola* Lipovsky, 1952

Type species: *Speleocola tadaridae* Lipovsky, 1952.

Speleocola secunda Brennan and Jones

Speleocola secunda Brennan and Jones, 1960, p. 509.

One larva off *Monodelphis brevicaudata*, Yaracuy, 20 km NW San Felipe (Minas de Aroa), 425 m, 7 Dec 1967; 5 off *Phyllostomus hastatus*, Barinas, Altamira, 794 m, 21 Dec 1967; 1 off *Artibeus jamaicensis*, Zulia, 42 km WNW Encontrados (El Rosario), 24 m, 4 Mar 1968; 1 off *Desmodus rotundus*, Trujillo, 23 km NW Valera (Agua Santa), 90 m, 6 Sep 1965; 5 off *Molossus aztecus*, Bolívar, 47 km ESE Caicara (Hato La Florida), 50 m, 19 Apr 1967; 1 off *Rhipidomys venezuelae*, Falcón, 80 km NW Carora (Río Socopo), 470 m, 22 May 1968; 12 off *R. fulviventer*, Monagas, 5 km NW Caripe (San Agustín), 1170 m, 26 Jun 1967; 1 off *Rattus rattus*, Trujillo, 30 km NW Valera (El Dividive), 90 m, 20 Oct 1965.

S. secunda was described from Trinidad, off *Micronycteris hirsuta*. Other records from: *Coendou rothschildi*, Panamá (Brennan and Yunker, 1966); *Peropteryx macrotis*, Isla Margarita (Brennan, 1967); *Peromyscus yucatanicus*, Yucatan Peninsula (Loomis, 1969, Loomis and Webb, 1969); *Phyllostomus discolor*, *Saccopteryx bilineata*, and *Molossus bondae*, Costa Rica; *Molossus sinaloae*, *Glossophaga soricina*, *Nyctomys sumichrasti*, and *S. bilineata*, Nicaragua; *Micronycteris megalotis* and *Desmodus rotundus*, Trinidad (Loomis and Webb, 1969); *Carollia perspicillata* and *S. bilineata*, Surinam (Brennan and Lukoschus, 1971).

Speleocola sp. A

Three larvae off *Carollia perspicillata*, Monagas, 3 km SW Caripe, 854 m, 11 Jul 1967; 36 off 6 *Peropteryx kappleri* same locality and date.

Genus *Vanidicus* Brennan and Jones, 1961

Type species: *Vanidicus tricosus* Brennan and Jones, 1961.

Vanidicus chalepus Brennan

Vanidicus chalepus Brennan, 1973, p. 107.

Known only from the type series off *Ory-*

zomys albigularis, Mérida, and other specimens off *Heteromys anomalus,* Falcón, and *Monodelphis brevicaudata,* Yaracuy.

Vanidicus jojosti Brennan

Vanidicus jojosti Brennan, 1973, p. 109.

Known only from the type series off *Proechimys guyannensis,* Monagas, and additional material off *Heteromys anomalus, Oryzomys albigularis,* and *P. guyannensis,* Miranda, off *P. guyannensis,* Bolívar, and *O. albigularis,* Mérida.

Genus *Wagenaaria* Brennan, 1967

Type species: *Wagenaaria similis* Brennan, 1967

Wagenaaria similus Brennan

Wagenaaria similis Brennan, 1967, p. 148.

Reed and Brennan (1974) record 1 larva off *Pteronotus davyi,* Yaracuy, 20 km NW San Felipe (Minas de Aroa), 395 m, 12 Dec 1967; and 1 off *P. parnellii,* Sucre, 12 km NE Güiria (Ensenada Cuaranta), 90 m, 17 Jun 1967.

The only other record of this bat chigger since described from 23 larvae off 3 *Mormoops megalophylla,* Curaçao, is that of Loomis (1969): 3 larvae off *Pteronotus davyi,* Campeche, Mexico.

Genus *Whartonia* Ewing, 1944

Type species: *Hannemania nudosetosa* Wharton, 1938

Whartonia (*Asolentria*) *guerrerensis* Hoffmann

Whartonia guerrerensis Hoffmann, 1960, p. 5.

Reed and Brennan (1974) record 2 larvae off *Mormoops megalophylla,* Sucre, 9 km NE Güiria (Ensenada Cuaranta), 1 m, 5 Jun 1967; and 9 off 3 *M. megalophylla,* 10 km NE Güiria (Río Salado), 90 m, 7 Jun 1967.

Described off *Mormoops megalophylla,* Guerrero, México, and later recorded by Brennan and Jones (1960) as *Whartonia trinidadensis,* off *M. megalophylla,* Trinidad; other records; of *Erophylla sezekornia,* Bahamas *Peropteryx macrotis,* Isla Margarita; *M. megalophylla,* Aruba and Curaçao (Brennan, 1967); off *M. megalophylla,* Campeche, México (Loomis, 1969).

Whartonia (*W.*) *nudosetosa* Wharton

Hannemania nudosetosa Wharton, 1938, p. 142.

About 300 larvae identified from 89 bats, summarily recorded by Reed and Brennan (1974): 6 *Peropteryx kappleri,* 1 *Noctilio labialis,* 1 *Chrotopterus auritus,* 1 *Glossophaga longirostris,* 20 *G. soricina,* 9 *Lionycteris spurrelli,* 4 *Anoura caudifera,* 2 *A. geoffroyi,* 2 *Anoura* sp. A., 11 *Carollia brevicauda,* 23 *C. perspicillata,* 2 *Sturnira lilium,* 1 *Vampyrops aurarius,* 1 *Chiroderma villosum,* 1 *Artibeus jamaicensis,* 1 *Ametrida centurio,* 3 *Desmodus rotundus.*

Amazonas, 135-1140 m, 2 Feb, 7-27 Jul, and 6 Sep to Oct 1967; Apure, 24-76 m, 17 Jan 1966 and 21-26 Jan 1968; Barinas, 609-1070 m, 13 Dec 1967 to 4 Jan 1968; Bolívar, 50-1165 m, 7 Apr to 23 Jun 1966, 7 Apr 1967, and 30 Apr 1968; Carabobo, 900 m, 23 Nov 1967; Distrito Federal, 380 m, 21 Aug 1966; Falcón, 60-230 m, 14-25 Nov 1967; Mérida, 2190 m, 21 Apr 1966; Miranda, 90 m, 30 Dec 1965; Zulia, 37 and 1135 m, 27 Mar to 7 May 1968.

Described off *Artibeus jamaicensis* and *Peropteryx canina,* Yucatán. Other records from: *Nycteris borealis* and unidentified bats, Puebla, Mexico (Hoffman, 1949); leaf-nosed bat, Jamaica (Brennan, 1953); *Desmodus rotundus,* Trinidad (Brennan and Jones, 1960); *Carollia perspicillata,* Guatemala (Brennan and Dalmat, 1960); *C. perspicillata,* Trinidad (Brennan, 1967); *C. perspicillata,* Quintana Roo; *Artibeus jamaicensis, D. rotundus* and *Mimon cozumelae,* Yucatan (Loomis, 1969).

Whartonia (*W.*) *angulascuta* Reed and Brennan

Whartonia (*W.*) *angulascuta* Reed and Brennan 1974, p. 35

No records other than those of the original description: 7 larvae off *Chrotopterus auritus,* 1 off *Carollia brevicauda,* 5 off *C. perspicillata* and 2 off *Diphylla ecaudata,* from Monagas.

Genus A, sp. A

Seven larvae off *Marmosa robinsoni,* Falcón, Peninsula de Paraguaná, 15 km, SSW Pueblo Nuevo (Cerro Santa Ana), 550 m, 30 Jul 1968.

This taxon has affinities with *Euschoengastoides* Loomis (1954), of which it may be a subgenus.

Euschoengastia sensu lato *aemulata* Brennan and Jones

Euschoengastia aemulata Brennan and Jones, 1964, p. 307.

Recorded by Brennan and Jones (1964) from Venezuela: 8 larvae off bat, *Anoura caudata,* Aragua. No additional records.

**Euschoengastia* sensu lato *megastyrax* Brennan and Jones

Euschoengastia megastyrax Brennan and Jones, 1960, p. 506.

Four larvae off *Phyllostomus discolor*, Amazonas, 108 km SSE Esmeralda (Río Mavaca), 140 m, 14 Apr 1967; 6 off *P. discolor*, Miranda, Birongo, 60 m, 23 Jan 1968; 10 off *Trachops cirrhosus*, Amazonas, 84 km SSE Esmeralda (Boca Mavaca), 185 m, 20 Feb 1966; 9 off *Carollia perspicillata*, Barinas, 7 km NNE Altamira (Agua Fría), 1070 m, 25 Dec 1967; 1 off *Desmodus rotundus*, Apure, 29 km SSW Santo Domingo (Nulita), 24 m, 31 Jan 1968.

This bat chigger, described off *Desmodus rotundus*, Trinidad, has also been recorded (possibly a subspecies) from Panamá off *D. rotundus*, *C. perspicillata* and opossum, *Didelphis marsupialis*, by Brennan and Yunker (1966).

°*Schoengastia* sensu lato *guyanensis* Floch and Abonnenc

Schoengastia guyanensis Floch and Abonnenc, 1941, p. 13.

One larva off *Nectomys squamipes*, Bolívar, 53 km ESE Caicara (Hato La Florida), 56 m, 6 May 1967; 18 off 2 *Sigmomys alstoni*, Bolívar 46 km NE Icabaru, 800 m, 12 May 1968; 4 off *S. alstoni*, 44 km ESE Caicara (Hato La Florida), 45 m, 2 May 1968.

Known also from French Guiana whence it was described off domestic dog and man, later recorded by Fauran (1959, 1960) off *Myoprocta acouchy*; Boshell and Kerr (1942) described this species as *Neoschongastia nasuae* off *Nasua condace*, Colombia; other Colombian records: 15 larvae off *Proechimys* sp., Meta, San Juan de Arama (Los Micos), 1300 ft., 23 Apr 1957; 9 off *Nasuella olivacea*, Meta, Restrepo, date not available.

°*Trombicula* sensu lato *dunni* Ewing

Trombicula dunni Ewing, 1931, p. 12.

Five larvae off 2 *Holochilus brasiliensis*, 1 off *Oryzomys concolor*, 9 off *Philander opossum*, Bolívar, 20 km W La Paragua (Hato San José), 297-324 m, 27 Feb to 22 Mar 1967; 14 off 6 *Sigmomys alstoni*, Bolívar, 46 km NE Icabarú, 800 m, 15 May 1968; 1 off *Marmosa fuscata*, Monagas, 5 km NW Caripe (San Agustín), 1335 m, 6 Jul 1967; 2 off *S. alstoni*, Sucre, 26 km ESE Carúpano (Manacal), 413 m, 1 Aug 1967; 2 off *O. fulvescens*, Táchira, 41 km SW San Cristóbal (Buena Vista), 2398 m, 5 Mar 1968; 6 off *Sigmodon hispidus*, Carabobo, 5 km SE Montalbán (Sabana Aguirre), 562 m, 4 Nov 1967; 13 off 4 *S. hispidus*, 4 off *Proechimys semispinosus*, 2 off *Sciurus granatensis*, Barinas, Altamira, 600-794 m, 18 Dec 1967 to 8 Jan 1968; 3 off 3 *P. semispinosus*, Apure, 29 km SSW Santo Domingo (Nulita), 24 m, 26 Jan to 6 Feb 1968; 1 off *Agouti paca*, Zulia, 60 km WNW Encontrados (Boca del Río de Oro), 73 m, 18 Mar 1968.

Described from the type series off *Dasyprocta punctata* and other specimens off *Nasua narica*, Chiriqui, Panamá. Other records: Brennan and Jones (1960) redescribed *T. dunni*, designated a lectotype, and identified 3 larvae off *Cuniculus paca*, Trinidad; 1 off *Oryzomys keaysi*, Peru (Brennan and Jones, 1961a); about 900 from 165 collections of a large variety of mammals and birds, Panamá (Brennan and Yunker, 1966); 45 from 27 lots of *Oryzomys albigularis*, *O. alfaroi*, *O. caliginosus*, *Heteromys australis*, and *Thomasomys fuscatus*, Colómbia (Brennan, 1968a); 5 off *Philander opossum* and 1 off *Proechimys* sp., Rondônia, Brazil (Brennan, 1970b). Also described as: *Trombicula canis* Floch and Abonnenc, 1941, off dog and man, French Guiana; *T. landazuri* Boshell and Kerr, 1942, off *Proechimys chrisaeolus*, *Cuniculus paca*, and man, Colombia; *T. agutii* Floch and Fauran, 1957, off *Dasyprocta aguti*, French Güiana; *T. paragoga* Brennan and Jones, 1960, off *Nectomys squamipes* and *Echimys armatus*, Trinidad.

This neotropical species, very common on a variety of mammals and some birds, was regarded by Brennan and Yunker (1966) and Brennan (1968a) as polymorphic, with easily distinguishable forms, but occasionally showing intergradation in large series. Probably this taxon should be regarded as a species complex.

°*Trombicula* sensu lato *macrozota* Brennan and Jones

Trombicula macrozota Brennan and Jones, 1960, p. 518.

Two larvae off *Mormoops megalophylla*, Yaracuy, 20 km NW San Felipe (Minas de Aroa), 395 m, 13 Dec 1967; 18 off 2 *M. megalophylla*, Sucre, 10 km NE Güiria (Ensenada Cuaranta), 90 m, 7 Jun 1967.

Described from numerous larvae off 2 *Mormoops megalophylla*, Trinidad. An additional record is 2 off *M. megalophylla*, Colombia, Santander, Macaregua San Gil, 18 Apr 1967, Dr. C. J. Marinkelle.

°*Trombicula* sensu lato *monops* Brennan and Jones

Trombicula monops Brennan and Jones, 1960, p. 524.

One larva off *Pteronotus suapurensis*, Yaracuy, 20 km NW San Felipe (Minas de Aroa), 395 m, 12 Dec 1967.

Described from 20 specimens off 2 *Mormoops megalophylla*, Trinidad. Later recorded by Brennan and Yunker (1966) from Panamá off *Myotis nigricans*, *Pteronotus psilotis*, and unidentified bat. A new record is 1 off *Mormoops megalophylla*, Colómbia, Santander, Macaregua, 8 Aug 1967, Dr. C. J. Marinkelle.

Trombicula sensu lato sp. A

One larva off *Oryzomys albigularis*, Miranda, 5 km NNE Caracas (Pico Avila), 2124 m, 28 Aug 1965; 1 off *O. albigularis* and 8 off 2 *Thomasomys lugens*, Trujillo, 14 km E Trujillo (Hacienda Misisi), 2210-2215 m, 26-29 Jan 1966; 9 off *O. minutus*, Mérida, 7 km SE Tabay (nr. La Coromoto), 3150 m, 22 Mar 1966; 10 off *Thomasomys* sp., 2 off *O. albigularis*, and 22 off 3 *T. lugens*, Mérida, 6-7 km ESE Tabay (nr. Middle Refugio), 2570-2600 m, 10-24 Apr 1966; 1 off *Vampyrops aurarius* Bolívar, 85 km SSE El Dorado (KM 125), 1032 m, 16 May 1966.

Trombicula sensu lato sp. B

Seventeen larvae off 2 *Sigmodon hispidus*, Carabobo, Montalbán (Potrerito and Sanjón), 598 m, 7 Mar 1967; 10 off 6 *S. hispidus*, Lara, 10 km N El Tocuyo (Caserio Boro), 537-900 m, 17-19 Jul 1967.

Trombicula sensu lato sp. F

One larva off *Heteromys anomalus*, Guárico, 15 km NW Altagracia (Guatopo National Park), 680 m, 1 Oct 1966; 2 off *Didelphis marsupialis* and 3 off *Mazama gouazoubira*, Bolívar, 20 km W La Paragua (Hato San Jose), 324-330 m, 16-19 Mar 1967; 1 off *D. marsupialis*, Miranda, 3 km NE Caracas (Quebrada Chacaito), 1150 m, 15 May 1967; 12 off 3 *Proechimys semispinosus*, Barinas, Altamira, 25 Dec 1967 to 11 Jan 1968; 12 off 6 *Proechimys semispinosus* and 1 off *Echimys armatus*, Apure, 29 km SSW Santo Domingo (Nulita), 24 m, 24 Jan to 5 Feb 1968.

HOST-PARASITE LIST

Class AMPHIBIA

- Frog
  - *Eutrombicula goeldii*

Class REPTILIA

- Lizard
  - *Eutrombicula alfreddugesi*
  - *Eutrombicula batatas*
  - *Eutrombicula goeldii*
  - *Eutrombicula tropica*
  - *Odontacarus australis*
  - *Parasecia* sp. H

Class AVES

- Bird
  - *Blankaartia sinnamaryi*
  - *Eutrombicula batatas*
  - *Eutrombicula goeldii*
  - *Eutrombicula webbi*
  - *Hooperella vesperuginis*
  - *Loomisia desmodus*
  - *Microtrombicula fragibarba*
  - *Microtrombicula* sp. D
  - *Neoschoengastia americana*
  - *Odontacarus comosus comosus*
  - *Parasecia manueli*
  - *Parasecia psittaci*
- Owl
  - *Blankaartia sinnamaryi*
  - *Neoschoengastia americana*

Class MAMMALIA

Order MARSUPIALIA

- Family Caenolestidae
  - *Caenolestes obscurus*
    - *Crotiscus* sp. A
    - *Peltoculus bobbiannae*
- Family Didelphidae
  - *Caluromys philander*
    - *Eutrombicula goeldii*
  - *Didelphis azarae*
    - *Crotiscus* sp. A
    - *Eutrombicula goeldii*
    - *Eutrombicula neotropicalis*
    - *Eutrombicula tanychaeta*
    - *Eutrombicula vacillata*
    - *Eutrombicula wolfenbargeri*
  - *Didelphis marsupialis*
    - *Colicus johnsoni*
    - *Eutrombicula batatas*
    - *Eutrombicula goeldii*
    - *Microtrombicula fragibarba*
    - *Odontacarus tubercularis*
    - *Odontacarus sunnianae*
    - *Quadraseta* sp. C
    - *Trombicula* (s.l.) sp. F
  - *Lutreolina crassicaudata*
    - *Eutrombicula batatas*
    - *Eutrombicula* sp. P
  - *Marmosa cinerea*
    - *Eutrombicula alfreddugesi*
    - *Eutrombicula goeldii*

Marmosa dryas
  Crotiscus sp. A
  Eutrombicula cricetivora
  Eutrombicula leegoffi
  Eutrombicula tachirae
  Odontacarus comosus comosus
Marmosa fuscata
  Crotiscus desdentatus
  Eutrombicula alfreddugesi
  Eutrombicula batatas
  Eutrombicula cricetivora
  Eutrombicula goeldii
  Eutrombicula leegoffi
  Eutrombicula marmosa
  Eutrombicula pacae
  Eutrombicula spipi
  Hoffmannina reedi
Marmosa fuscata
  Odontacarus tubercularis
  Odontacarus sunnianae
  Odontacarus comosus comosus
  Trombicula (s.l.) *dunni*
Marmosa impavida
  Crotiscus sp. A
  Eutrombicula lukoschusi
  Odontacarus comosus comosus
Marmosa murina
  Eutrombicula goeldii
Marmosa robinsoni
  Atelepalme sp. A
  Crotiscus sp. A
  Eutrombicula alfreddugesi
  Eutrombicula batatas
  Eutrombicula goeldii
  Eutrombicula pacae
  Eutrombicula tinami
  Eutrombicula tropica
  Hooperella vesperuginis
  Microtrombicula fragibarba
  Microtrombicula tragulata
  Nasicola annereauxi
  Odontacarus cayolargoensis
  Odontacarus tubercularis
  Parasecia aitkeni
  Quadraseta antillarum
  Quadraseta flochi
  Quadraseta sp. C
  Quadraseta sp. D
  Genus A sp. A
Marmosa sp. A
  Eutrombicula goeldii
  Odontacarus (*O.*) *tubercularis*
Marmosa sp.
  Eutrombicula batatas
  Eutrombicula webbi
  Odontacarus tubercularis
  Parasecia aitkeni
Metachirus nudicaudatus
  Eutrombicula goeldii
  Eutrombicula tropica
Monodelphis brevicaudata
  Colicus colombiae
  Colicus sp. B
  Eutrombicula batatas
  Eutrombicula goeldii
  Kymocta faitkeni
  Odontacarus tubercularis
  Quadraseta flochi
  Quadraseta sp. C
  Speleocola secunda
  Vanidicus chalepus
Philander opossum
  Crotiscus desdentatus
  Eutrombicula alfreddugesi
  Eutrombicula goeldii
  Eutrombicula tropica
  Parasecia manueli
  Trombicula (s.l.) *dunni*

Order INSECTIVORA

Family Soricidae

Cryptotis thomasi
  Crotiscus sp. A
  Eutrombicula goeldii
  Eutrombicula variabilis
  Eutrombicula wolfenbargeri
  Hoffmannina sp. A
  Odontacarus dienteslargus
  Peltoculus bobbiannae

Order CHIROPTERA

Family Desmodidae

Desmodus rotundus
  Beamerella acutascuta
  Hooperella saccopteryx
  Hooperella vesperuginis
  Loomisia desmodus
  Microtrombicula boneti
  Nycterinastes primus
  Perissopalla precaria
  Speleocola secunda
  Whartonia nudosetosa
  Euschoengastia (s.l.) *megastyrax*
Diphylla ecaudata
  Whartonia angulascuta

Family Emballonuridae

Cormura brevirostris
  Hooperella saccopteryx
  Loomisia yunkeri
Peropteryx kappleri
  Hooperella saccopteryx
  Hooperella vesperuginis
  Loomisia bulbocalcar
  Loomisia desmodus
  Perissopalla precaria
  Perissopalla tanycera
  Perissopalla sp. A
  Perissopalla sp. B
  Speleocola sp. A
  Whartonia nudosetosa
Peropteryx macrotis
  Hooperella saccopteryx
  Loomisia bulbocalcar
  Loomisia desmodus
  Loomisia yunkeri
  Perissopalla precaria
  Perissopalla tanycera
  Perissopalla sp. A
  Speleocola secunda
  Whartonia guerrerensis
Peropteryx trinitatis
  Loomisia yunkeri
  Perissopalla tanycera
Rhynchonycteris naso
  Eutrombicula variabilis

- *Saccopteryx bilineata*
  - *Beamerella acutascuta*
  - *Eutrombicula goeldii*
  - *Hooperella saccopteryx*
  - *Hooperella vesperuginis*
  - *Loomisia desmodus*
  - *Odontacarus tubercularis*
  - *Parasecia aitkeni*
  - *Parasecia longicalcar*
- *Saccopteryx leptura*
  - *Hooperella saccopteryx*
- *Saccopteryx* sp.
  - *Hooperella saccopteryx*

Family Molossidae

- *Molossops paranus*
  - *Eutrombicula alfreddugesi*
- *Molossops planirostris*
  - *Nasicola annereauxi*
- *Molossus ater*
  - *Beamerella acutascuta*
  - *Hooperella saccopteryx*
  - *Hooperella vesperuginis*
  - *Parasecia* sp. A
- *Molossus aztecus*
  - *Beamerella* sp. A
  - *Speleocola secunda*
- *Molossus molossus*
  - *Eutrombicula goeldii*
- *Molossus sinaloae*
  - *Beamerella* sp. A
- *Neoplatymops mattogrossensis*
  - *Hoffmannina* sp. A
  - *Microtrombicula* sp. C
  - *Parasecia manueli*
  - *Parasecia* sp. A
  - *Parasecia* sp. I
- *Promops nasutus*
  - *Crotiscus desdentatus*
- *Tadarida gracilis*
  - *Chiroptella australis*
  - *Eutrombicula tropica*
  - *Parasecia* sp. A
  - *Parasecia* sp. E
  - *Parasecia* sp. I

Family Mormoopidae

- *Mormoops megalophylla*
  - *Whartonia guerrerensis*
  - *Trombicula* (s.l.) *macrozota*
- *Pteronotus davyi*
  - *Wagenaaria similis*
- *Pteronotus parnellii*
  - *Hooperella vesperuginis*
  - *Microtrombicula boneti*
  - *Nycterinastes primus*
- *Pteronotus psilotis*
  - *Phalcophila antica*
  - *Phalcophila postica*
- *Pteronotus suapurensis*
  - *Trombicula* (s.l.) *monops*

Family Noctilionidae

- *Noctilio labialis*
  - *Eutrombicula batatas*
  - *Perissopalla precaria*
  - *Whartonia nudosetosa*

Family Phyllostomidae

- *Ametrida centurio*
  - *Whartonia nudosetosa*
- *Anoura caudifera*
  - *Microtrombicula boneti*
  - *Whartonia nudosetosa*
- *Anoura geoffroyi*
  - *Nycterinastes primus*
  - *Nycterinastes secundus*
  - *Perissopalla* sp. F
  - *Whartonia nudosetosa*
- *Anoura* sp. A
  - *Nycterinastes primus*
  - *Perissopalla precaria*
  - *Whartonia nudosetosa*
- *Anoura* sp.
  - *Loomisia desmodus*
- *Artibeus cinereus*
  - *Eutrombicula goeldii*
- *Artibeus harti*
  - *Microtrombicula carmenae*
  - *Parasecia* sp. G
- *Artibeus jamaicensis*
  - *Beamerella acutascuta*
  - *Eutrombicula webbi*
  - *Hooperella vesperuginis*
  - *Microtrombicula carmenae*
  - *Microtrombicula* sp. A
  - *Odontacarus shoenesetosus*
  - *Speleocola secunda*
  - *Whartonia nudosetosa*
- *Artibeus lituratus*
  - *Parasecia aitkeni*
  - *Perissopalla precaria*
  - *Quadraseta* sp. C
- *Carollia brevicauda*
  - *Eutrombicula goeldii*
  - *Eutrombicula pacae*
  - *Hooperella saccopteryx*
  - *Hooperella vesperuginis*
  - *Loomisia alcithoae*
  - *Loomisia desmodus*
  - *Odontacarus tubercularis*
  - *Perissopalla precaria*
  - *Perissopalla* sp. A
  - *Perissopalla* sp. B
  - *Whartonia nudosetosa*
  - *Whartonia angulascuta*
- *Carollia perspicillata*
  - *Beamerella acutascuta*
  - *Boshkerria punctata*
  - *Hooperella vesperuginis*
  - *Loomisia alcithoae*
  - *Loomisia desmodus*
  - *Loomisia yunkeri*
  - *Microtrombicula boneti*
  - *Microtrombicula carmenae*
  - *Microtrombicula* sp. C
  - *Nycterinastes primus*
  - *Parasecia manueli*
  - *Perissopalla precaria*
  - *Perissopalla* sp. A
  - *Perissopalla* sp. E
  - *Perissopalla* sp. F
  - *Perissopalla* sp. A
  - *Whartonia nudosetosa*
  - *Whartonia angulascuta*
  - *Euschoengastia* (s.l.) *megastyrax*

- *Chiroderma trinitatum*
  - *Perissopalla tanycera*
- *Chiroderma villosum*
  - *Hooperella vesperuginis*
  - *Whartonia nudosetosa*
- *Chrotopterus auritus*
  - *Hooperella vesperuginis*
  - *Loomisia desmodus*
  - *Whartonia nudosetosa*
  - *Whartonia angulascuta*
- *Glossophaga longirostris*
  - *Eutrombicula goeldii*
  - *Hooperella vesperuginis*
  - *Loomisia desmodus*
  - *Loomisia yunkeri*
  - *Perissopalla precaria*
  - *Whartonia nudosetosa*
- *Glossophaga soricina*
  - *Hooperella vesperuginis*
  - *Loomisia desmodus*
  - *Nycterinastes primus*
  - *Perissopalla precaria*
  - *Perissopalla* sp. D
  - *Whartonia nudosetosa*
- *Glossophaga* sp.
  - *Hooperella vesperuginis*
- *Leptonycteris curosoae*
  - *Apolonia tigipioensis*
  - *Perissopalla precaria*
- *Lionycteris spurrelli*
  - *Hooperella vesperuginis*
  - *Nycterinastes primus*
  - *Whartonia nudosetosa*
- *Lonchophylla robusta*
  - *Loomisia desmodus*
  - *Parasecia* sp. D
- *Lonchorhina aurita*
  - *Nycterinastes primus*
  - *Odontacarus schoenesetosus*
  - *Odontacarus vergrandi*
- *Macrophyllum macrophyllum*
  - *Eutrombicula variabilis*
- *Micronycteris hirsuta*
  - *Hooperella vesperuginis*
- *Micronycteris megalotis*
  - *Beamerella acutascuta*
  - *Eutrombicula batatas*
  - *Hooperella vesperuginis*
  - *Loomisia desmodus*
- *Micronycteris microtis*
  - *Hooperella vesperuginis*
  - *Odontacarus tubercularis*
  - *Perissopalla precaria*
- *Micronycteris nicefori*
  - *Hooperella vesperuginis*
- *Mimon crenulatum*
  - *Beamerella acutascuta*
  - *Hooperella saccopteryx*
  - *Parasecia manueli*
- *Phylloderma stenops*
  - *Hooperella vesperuginis*
- *Phyllostomus discolor*
  - *Beamerella acutascuta*
  - *Eutrombicula goeldii*
  - *Hooperella vesperuginis*
  - *Microtrombicula carmenae*
  - *Perissopalla precaria*
  - *Euschoengastia* (s.l.) *megastyrax*
- *Phyllostomus elongatus*
  - *Hooperella vesperuginis*
- *Phyllostomus hastatus*
  - *Eutrombicula goeldii*
  - *Hooperella vesperuginis*
  - *Nasicola annereauxi*
  - *Speleocola secunda*
- *Sturnira erythromus*
  - *Hooperella vesperuginis*
  - *Parasecia* sp. F
  - *Parasecia* sp. G
- *Sturnira lilium*
  - *Eutrombicula goeldii*
  - *Loomisia desmodus*
  - *Microtrombicula carmenae*
  - *Perissopalla precaria*
  - *Perissopalla* sp. A
  - *Whartonia nudosetosa*
- *Sturnira ludovici*
  - *Microtrombicula carmenae*
- *Sturnira tildae*
  - *Hooperella vesperuginis*
- *Trachops cirhosus*
  - *Beamerella acutascuta*
  - *Hooperella vesperuginis*
  - *Loomisia desmodus*
  - *Euschoengastia* (s.l.) *megastyrax*
- *Vampyressa pusilla*
  - *Crotiscus desdentatus*
  - *Loomisia desmodus*
  - *Odontacarus tubercularis*
- *Vampyrops aurarius*
  - *Trombicula* (s.l.) sp. A
  - *Whartonia nudosetosa*
- *Vampyrops helleri*
  - *Crotiscus desdentatus*
  - *Eutrombicula nadchatrami*
  - *Odontacarus tubercularis*

Family Vespertilionidae

- *Eptesicus fuscus*
  - *Perissopalla* sp. C
- *Eptesicus montosus*
  - *Albeckia albecki*
- *Histiotus* sp. A
  - *Albeckia albecki*
  - *Parasecia aitkeni*
- *Myotis larensis*
  - *Quadraseta* sp. C

Order PRIMATES

Family Cebidae

- *Callicebus torquatus*
  - *Eutrombicula tropica*

Order EDENTATA

Family Myrmecophagidae

- *Cyclopes didactylus*
  - *Eutrombicula alfreddugesi*
- *Tamandua longicaudata*
  - *Rhinibius tamandua*
- *Tamandua mexicana*
  - *Eutrombicula goeldii*

Order LAGOMORPHA

Family Leporidae

- *Sylvilagus brasiliensis*
  - *Apolonia tigipioensis*
  - *Eutrombicula alfreddugesi*

- *Sylvilagus floridanus*
    - *Apolonia tigipioensis*
    - *Atelepalme* sp. A.
    - *Eutrombicula batatas*
    - *Neotrombicula americana*
    - *Odontacarus tubercularis*
    - *Quadraseta antillarum*

Order RODENTIA

Family Cricetidae

- *Akodon bogotensis*
    - *Crotiscus* sp. A
    - *Eutrombicula neotropicalis*
    - *Eutrombicula tachirae*
    - *Odontacarus dienteslargus*
    - *Odontacarus tuberculohirsutus*
    - *Peltoculus bobbiannae*
    - *Quadraseta* sp. A
- *Akodon urichi*
    - *Colicus* sp. A
    - *Eutrombicula goeldii*
    - *Kymocta inca*
    - *Odontacarus tubercularis*
    - *Parasecia manueli*
    - *Quadraseta flochi*
    - *Quadraseta* sp. A
- *Calomys hummelincki*
    - *Atelepalme* sp. A
- *Chilomys instans*
    - *Eutrombicula tachirae*
    - *Odontacarus dienteslargus*
- *Daptomys venezuelae*
    - *Hoffmannina* sp. B
- *Holochilus brasiliensis*
    - *Eutrombicula alfreddugesi*
    - *Eutrombicula batatas*
    - *Trombicula* (s.l.) *dunni*
- *Neacomys tenuipes*
    - *Kymocta inca*
- *Nectomys alfari*
    - *Crotiscus desdentatus*
    - *Odontacarus tubercularis*
- *Nectomys squamipes*
    - *Aitkenius ciscunctatus*
    - *Crotiscus desdentatus*
    - *Eutrombicula alfreddugesi*
    - *Eutrombicula batatas*
    - *Eutrombicula goeldii*
    - *Eutrombicula tropica*
    - *Pseudoschoengastia bulbifera*
    - *Schoengastia* (s.l.) *guyanensis*
- *Oryzomys albigularis*
    - *Aitkenius senticosus*
    - *Colicus pichindensis*
    - *Colicus* sp. A
    - *Crotiscus desdentatus*
    - *Crotiscus* sp. A
    - *Eutrombicula cricetivora*
    - *Eutrombicula leegoffi*
    - *Eutrombicula lukoschusi*
    - *Eutrombicula marmosa*
    - *Eutrombicula nadchatrami*
    - *Eutrombicula neotropicalis*
    - *Eutrombicula tachirae*
    - *Eutrombicula variabilis*
    - *Eutrombicula webbi*
    - *Odontacarus comosus comosus*
    - *Odontacarus comosus novemsetus*
    - *Odontacarus dienteslargus*
    - *Odontacarus sunniannae*
    - *Odontacarus tiptoni*
    - *Odontacarus tubercularis*
    - *Odontacarus vanderhammeni*
    - *Peltoculus bobbiannae*
    - *Quadraseta flochi*
    - *Quadraseta* sp. A
    - *Quadraseta* sp. C
    - *Vanidicus chalepus*
    - *Vanidicus jojosti*
    - *Trombicula* (s.l.) sp. A
- *Oryzomys bicolor*
    - *Eutrombicula alfreddugesi*
    - *Eutrombicula goeldii*
- *Oryzomys capito*
    - *Eutrombicula goeldii*
    - *Odontacarus tubercularis*
    - *Quadraseta flochi*
    - *Quadraseta* sp. A
- *Oryzomys concolor*
    - *Eutrombicula alfreddugesi*
    - *Eutrombicula tropica*
    - *Odontacarus tubercularis*
    - *Trombicula* (s.l.) *dunni*
- *Oryzomys fulvescens*
    - *Crotiscus* sp. A
    - *Eutrombicula batatas*
    - *Eutrombicula goeldii*
    - *Odontacarus tubercularis*
    - *Quadraseta* sp. A
- *Oryzomys minutus*
    - *Aitkenius senticosus*
    - *Crotiscus desdentatus*
    - *Crotiscus* sp. A
    - *Eutrombicula goeldii*
    - *Eutrombicula cricetivora*
    - *Eutrombicula goeldii*
    - *Eutrombicula jenkensi*
    - *Eutrombicula leegoffi*
    - *Eutrombicula longiseta*
    - *Eutrombicula lukoschusi*
    - *Eutrombicula neotropicalis*
    - *Eutrombicula tachirae*
    - *Eutrombicula venezuelensis*
    - *Eutrombicula webbi*
    - *Eutrombicula wolfenbargeri*
    - *Hoffmannina* sp. A
    - *Odontacarus comosus comosus*
    - *Odontacarus comosus novemsetus*
    - *Odontacarus dienteslargus*
    - *Odontacarus tiptoni*
    - *Odontacarus tubercularis*
    - *Odontacarus tuberculohirsutus*
    - *Odontacarus vanderhammeni*
    - *Odontacarus vergrandi*
    - *Peltoculus bobbiannae*
    - *Quadraseta* sp. A
    - *Trombicula* (s.l.) sp. A
- *Oryzomys* sp.
    - *Crotiscus desdentatus*
    - *Eutrombicula batatas*
    - *Eutrombicula goeldii*
    - *Peltoculus bobbiannae*
    - *Quadraseta* sp. A
- *Rhipidomys couesi*
    - *Eutrombicula goeldii*
- *Rhipidomys fulviventer*
    - *Microtrombicula fragibarba*

- *Speleocola secunda*

- *Rhipidomys leucodactylus*
  - *Parasecia manueli*
- *Rhipidomys macconnelli*
  - *Eutrombicula tropica*
  - *Hoffmannina* sp. B
  - *Kymocta faitkeni*
  - *Kymocta inca*
- *Rhipidomys venezuelae*
  - *Eutrombicula goeldii*
  - *Microtrombicula carmenae*
  - *Microtrombicula fragibarba*
  - *Parasecia aitkeni*
  - *Parasecia longicalcar*
  - *Quadraseta* sp. C
  - *Speleocola secunda*
- *Rhipidomys venustus*
  - *Crotiscus* sp. A
  - *Eutrombicula cricetivora*
  - *Eutrombicula leegoffi*
  - *Eutrombicula lukoschusi*
  - *Eutrombicula webbi*
  - *Microtrombicula fragibarba*
  - *Odontacarus comosus comosus*
  - *Parasecia soucouyanti*
  - *Speleocola secunda*
- *Rhipidomys* sp.
  - *Eutrombicula pacae*
  - *Eutrombicula neotropicalis*
  - *Kymocta inca*
  - *Rhinibius tamandua*
- *Sigmodon hispidus*
  - *Colicus pichindensis*
  - *Eutrombicula alfreddugesi*
  - *Eutrombicula batatas*
  - *Eutrombicula goeldii*
  - *Eutrombicula tropica*
  - *Intercutestrix exigua*
  - *Odontacarus tubercularis*
  - *Odontacarus sunnianae*
  - *Parasecia aitkeni*
  - *Pseudoschoengastia bulbifera*
  - *Quadraseta flochi*
  - *Trombicula* (s.l.) *dunni*
  - *Trombicula* (s.l.) sp. B
- *Sigmomys alstoni*
  - *Colicus colombiae*
  - *Eutrombicula alfreddugesi*
  - *Eutrombicula batatas*
  - *Eutrombicula goeldii*
  - *Eutrombicula tropica*
  - *Hooperella saccopteryx*
  - *Kymocta inca*
  - *Odontacarus tubercularis*
  - *Parasecia aitkeni*
  - *Parasecia manueli*
  - *Parasecia* sp. H
  - *Quadraseta flochi*
  - *Schoengastia* (s.l.) *guyanensis*
  - *Trombicula* (s.l.) *dunni*
- *Thomasomys aureus*
  - *Peltoculus bobbiannae*
- *Thomasomys hylophilus*
  - *Aitkenius senticosus*
  - *Crotiscus* sp. A
  - *Eutrombicula goeldii*
  - *Eutrombicula lukoschusi*
  - *Eutrombicula tachirae*
  - *Eutrombicula webbi*
  - *Odontacarus tubercularis*
  - *Odontacarus comosus comosus*
  - *Odontacarus dienteslargus*
  - *Peltoculus bobbiannae*
  - *Quadraseta* sp. A
- *Thomasomys laniger*
  - *Eutrombicula cricetivora*
  - *Eutrombicula goeldii*
  - *Eutrombicula jenkinsi*
  - *Eutrombicula venezuelensis*
  - *Eutrombicula webbi*
  - *Eutrombicula wolfenbargeri*
  - *Hoffmannina reedi*
  - *Hoffmannina* sp. A
  - *Odontacarus dienteslargus*
  - *Odontacarus schoenesetosus*
  - *Odontacarus pugnosus*
  - *Odontacarus tuberculohirsutus*
  - *Odontacarus vergrandi*
- *Thomasomys lugens*
  - *Crotiscus desdentatus*
  - *Eutrombicula goeldii*
  - *Eutrombicula jenkensi*
  - *Eutrombicula leegoffi*
  - *Eutrombicula longiseta*
  - *Eutrombicula neotropicalis*
  - *Eutrombicula variabilis*
  - *Eutrombicula webbi*
  - *Hoffmannina reedi*
  - *Odontacarus tubercularis*
  - *Odontacarus comosus novemsetus*
  - *Odontacarus tiptoni*
  - *Odontacarus vanderhammeni*
  - *Trombicula* (s.l.) sp. A
- *Thomasomys vestitus*
  - *Odontacarus schoenesetosus*
  - *Odontacarus tiptoni*
- *Thomasomys* sp.
  - *Hoffmannina* sp. A
  - *Peltoculus bobbiannae*
  - *Trombicula* (s.l.) sp. A
- *Zygodontomys brevicauda*
  - *Aitkenius ciscunctatus*
  - *Atelepalme smarma*
  - *Boshkerria punctata*
  - *Crotiscus desdentatus*
  - *Eutrombicula alfreddugesi*
  - *Eutrombicula batatas*
  - *Eutrombicula goeldii*
  - *Eutrombicula tropica*
  - *Neoschoengastia americana*
  - *Odontacarus tubercularis*
  - *Parasecia longicalcar*
  - *Parasecia manueli*
  - *Quadraseta antillarum*
  - *Quadraseta flochi*
  - *Quadraseta* sp. C

Family Dasyproctidae

- *Agouti paca*
  - *Boshkerria punctata*
  - *Eutrombicula alfreddugesi*
  - *Eutrombicula goeldii*
  - *Eutrombicula pacae*
  - *Odontacarus tubercularis*
  - *Parasecia aitkeni*
  - *Parasecia manueli*
  - *Trombicula* (s.l.) *dunni*

- *Dasyprocta aguti*
  - *Eutrombicula alfreddugesi*
  - *Eutrombicula goeldii*
  - *Eutrombicula tinami*
  - *Odontacarus tubercularis*
- *Dasyprocta fuliginosa*
  - *Colicus* sp. B
  - *Eutrombicula goeldii*
- *Dasyprocta variegata*
  - *Eutrombicula goeldii*
  - *Parasecia aitkeni*
- *Dasyprocta* sp.
  - *Eutrombicula goeldii*
  - *Eutrombicula pacae*
  - *Hoffmannina* sp. A
  - *Odontacarus tubercularis*
- *Myoprocta pratti*
  - *Eutrombicula alfreddugesi*
  - *Eutrombicula goeldii*

Family Echimyidae

- *Echimys armatus*
  - *Colicus johnsoni*
  - *Croticus desdentatus*
  - *Eutrombicula alfreddugesi*
  - *Eutrombicula spipi*
  - *Eutrombicula tropica*
  - *Hooperella vesperuginis*
  - *Parasecia aitkeni*
  - *Parasecia manueli*
  - *Trombicula* (s.l.) sp. F
- *Echimys semivillosus*
  - *Eutrombicula batatas*
  - *Parasecia aitkeni*
  - *Quadraseta* sp. C
- *Proechimys canicollis*
  - *Eutrombicula goeldii*
- *Proechimys guyannensis*
  - *Arisocerus amapensis*
  - *Boshkerria punctata*
  - *Buclypeus daptops*
  - *Colicus* sp. C
  - *Eutrombicula alfreddugesi*
  - *Eutrombicula goeldii*
  - *Eutrombicula tinami*
  - *Eutrombicula tropica*
  - *Hooperella saccopteryx*
  - *Intercutestrix mondolfii*
  - *Intercutestrix pisinna*
  - *Parasecia manueli*
  - *Perissopalla precaria*
  - *Polyopadium chaetolecanium*
  - *Quadraseta* sp. C
  - *Vanidicus jojosti*
- *Proechimys semispinosus*
  - *Aitkenius ciscunctatus*
  - *Aitkenius hystricosus*
  - *Boshkerria punctata*
  - *Buclypeus daptops*
  - *Crotiscus desdentatus*
  - *Eutrombicula alfreddugesi*
  - *Eutrombicula batatas*
  - *Eutrombicula goeldii*
  - *Eutrombicula pacae*
  - *Eutrombicula tinami*
  - *Eutrombicula tropica*
  - *Eutrombicula neotropicalis*
  - *Intercutestrix exigua*
  - *Odontacarus cayolargoensis*
  - *Odontacarus tubercularis*
  - *Odontacarus sunnianae*
  - *Parasecia aitkeni*
  - *Parasecia longicalcar*
  - *Parasecia manueli*
  - *Parasecia* sp. A
  - *Parasecia* sp. C
  - *Pseudoschoengastia bulbifera*
  - *Quadraseta flochi*
  - *Quadraseta* sp. B
  - *Quadraseta* sp. C
  - *Trombicula* (s.l.) *dunni*
  - *Trombicula* (s.l.) sp. F
- *Proechimys* sp.
  - *Odontacarus sunnianae*
  - *Polylopadium aspasium*
  - *Polylopadium tricholecanium*

Family Heteromyidae

- *Heteromys anomalus*
  - *Anomalaspis ambigua*
  - *Boshkerria punctata*
  - *Crotiscus desdentatus*
  - *Crotiscus* sp. A
  - *Eutrombicula goeldii*
  - *Kymocta zulia*
  - *Odontacarus comosus novemsetus*
  - *Odontacarus tubercularis*
  - *Parasecia manueli*
  - *Polylopadium chaetolecanium*
  - *Pseudoschoengastia bulbifera*
  - *Quadraseta flochi*
  - *Quadraseta* sp. C
  - *Vanidicus chalepus*
  - *Vanidicus jojosti*
  - *Trombicula* (s.l.) sp. F
- *Heteromys* sp. A
  - *Eutrombicula goeldii*
  - *Parasecia aitkeni*

Family Hydrochaeridae

- *Hydrochaeris hydrochaeris*
  - *Blankaartia sinnamaryi*

Family Muridae

- *Mus musculus*
  - *Apolonia tigipioensis*
- *Rattus norvegicus*
  - *Eutrombicula nadchatrami*
  - *Odontacarus tubercularis*
- *Rattus rattus*
  - *Crotiscus desdentatus*
  - *Eutrombicula batatas*
  - *Eutrombicula goeldii*
  - *Hooperella saccopteryx*
  - *Microtrombicula tragulata*
  - *Microtrombicula* sp. B
  - *Odontacarus tubercularis*
  - *Speleocola secunda*

Family Sciuridae

- *Sciurus aestuans*
  - *Crotiscus desdentatus*
- *Sciurus granatensis*
  - *Crotiscus desdentatus*

Crotiscus sp. A
Eutrombicula goeldii
Eutrombicula tropica
Odontacarus sunnianae
Odontacarus tubercularis
Sciurus sp.
Trombicula (s.l.) *dunni*

Order CARNIVORA

Family Procyonidae
Potos flavus
Microtrombicula tragulata
Microtrombicula sp. B

Order PERISSODACTYLA

Family Tapiridae
Tapirus terrestris
Eutrombicula goeldii

Order ARTIODACTYLA

Family Cervidae
Mazama americana
Eutrombicula goeldii
Odontacarus tubercularis
Mazama gouazoubira
Eutrombicula goeldii
Trombicula (s.l.) sp. F

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SPINTURNICID MITES OF VENEZUELA (ACARINA: SPINTURNICIDAE)

by

C. Selby Herrin[1] and Vernon J. Tipton[1]

ABSTRACT

The results of an extensive survey of spinturnicid mites of bats from Venezuela are presented in this paper. Approximately 30,000 bats were collected from a wide variety of life zones and localities. A representative sample was searched for ectoparasites. There are 3 genera of the family Spinturnicidae in Venezuela: *Cameronieta, Periglischrus,* and *Spinturnix*. Three previously described species of *Cameronieta* were found in the Venezuelan collection. Of the 7 species of *Spinturnix* previously described from the New World, 4 are reported from Venezuela. The genus *Periglischrus* constitutes by far the most significant segment of the Venezuelan collection. It is represented by 20 species. Of these, 15 were previously described and reported from Venezuela, and 5 are described here as new. Previously unknown males and immatures of several species are described. Keys on both generic and specific levels are included. Discussions of distinguishing morphological characters and variability, where pertinent, as well as collection data and discussions of host-parasite relationships are given for each species. Complete illustrations of 7 species are provided.

INTRODUCTION

Personnel associated with the Smithsonian Venezuelan Project collected approximately 30,000 bats between July 1965 and August 1968. More than 10,850 spinturnicid mites (over 3,760 collections) were collected from host bats. Bats were collected individually in most instances, and host identifications were provided by Dr. Charles O. Handley, Jr., codirector of the project. Thus, a large number of specimens of mites, individually collected hosts, accurate host determinations and specimens of bats representative of each major ecological subdivision of Venezuela have afforded us a unique opportunity to study spinturnicid mite systematics and ecological parameters, including host-parasite relationships. Primary objectives of this study were to clarify the systematics of Neotropical spinturnicid mites and to provide data on host-parasite associations and geographic distribution in Venezuela.

An excellent review of the systematics and biology of the Spinturnicidae was given by Rudnick (1960). Papers dealing with Neotropical representatives of the family have been published by Hoffmann (1944), Machado-Allison (1964, 1965a, 1965b, 1967), Machado-Allison and Antequera (1971), Furman (1966), Dusbabek (1967, 1968), and Dusbabek and Lukoschus (1971). Rudnick (1960) listed 7 genera of Spinturnicidae (8 genera are currently recognized, inasmuch as one new genus has been described since Rudnick's work). *Spinturnix* von Heyden, the largest genus, is cosmopolitan but is represented in the New World by only 7 species, 4 of which are recorded herein from Venezuela. *Periglischrus* Kolenati, a Neotropical genus associated primarily with bats of the family *Phyllostomidae*, constitutes by far the most significant segment of the Venezuelan collection. Fifteen of the 17 previously described valid Neotropical species of *Periglischrus* are represented in our collection, and, in addition, 5 new species are described. Machado-Allison (1965b) erected a separate genus, *Cameronieta*, for several species previously included in the genus *Periglischrus*. This recently described genus currently includes 6 species, 3 of which have been recorded only from Cuba (Dusbabek, 1967). The genera *Ancystropus* Kolenati, *Meristaspis* Kolenati, *Eyndhovenia* Rudnick, and *Paraperiglischrus*

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Rudnick are known only from Old World bats. The genus *Paraspinturnix* Rudnick is currently known only from the anal orifice of bats of the genus *Myotis* in North America. This paper thus includes 3 species of the genus *Cameronieta,* 20 species of the genus *Periglischrus* and 4 species of the genus *Spinturnix.*

In the treatment of each previously described species which was collected in Venezuela by the Smithsonian Venezuelan Project, the following are presented: Synonymy, brief description of a female and male, summary of the Venezuelan collection records, and finally a brief discussion of differential diagnostic characters and host-parasite relationships. The measurements given in descriptions of previously described species were made on a single representative specimen for each such species. For each new species described herein, the following are given: complete descriptions, with accompanying illustrations, for each of the life history stages present in the collections; complete collection records for type specimens; a summary of other Venezuelan records; and a brief discussion of differential diagnostic characters and host-parasite relationships. Measurements accompanying the description of each stage of the new species are of type specimens (holotype female, allotype male, and paratype immature stages). Illustrations were prepared for *P. hopkinsi* Machado-Allison, 1965a, and *P. parvus* Machado-Allison, 1964, which were inadequately illustrated in the original descriptions. Also, comparative illustrations of the sternal plates of all species of *Periglischrus* accompany the descriptions and keys for females.

For each of the new species described, the holotype, allotype (where described), and one or more paratypes are to be deposited in the U. S. National Museum of Natural History, Washington, D.C. Paratypes are to be deposited in the Instituto de Zoologia Tropical, Universidad Central de Venezuela, and in the collections of the authors.

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TAXONOMY

Proposed Classification of Venezuelan Spinturnicidae

- Genus *Cameronieta* Machado-Allison
  - *C. strandtmanni* (Tibbetts, 1957)
  - *C. elongatus* (Furman, 1966)
  - *C. thomasi* Machado-Allison, 1965b
- Genus *Periglischrus* Kolenati
  - Group I
    - Subgroup A
      - *P. parvus* Machado-Allison, 1964
      - *P. micronycteridis* Furman, 1966
      - *P. gameroi* Machado-Allison and Antequera, 1971
    - Subgroup B
      - *P. tonatii* n.sp.
      - *P. paracutisternus* Machado-Allison and Antequera, 1971
      - *P. acutisternus* Machado-Allison, 1964
      - *P. dusbabeki* Machado-Allison and Antequera, 1971
      - *P. grandisoma* n.sp.
    - Subgroup C
      - *P. torrealbai* Machado-Allison, 1965a
      - *P. paratorrealbai* n.sp.
  - Group II
    - Subgroup A
      - *P. caligus* Kolenati, 1857
      - *P. paracaligus* n.sp.
      - *P. paravargasi* n.sp.
      - *P. vargasi* Hoffman, 1944
    - Subgroup B
      - *P. hopkinsi* Machado-Allison, 1965a
      - *P. herrerai* Machado-Allison, 1965a
  - Group III
    - *P. ojastii* Machado-Allison, 1964
    - *P. ramirezi* Machado-Allison and Antequera, 1971
    - *P. iheringi* Oudemans, 1902
  - Group IV
    - *P. natali* Furman, 1966
- Genus *Spinturnix* von Heyden
  - Group I
    - *S. americanus* Banks, 1902

Group II
- S. *bakeri* Rudnick, 1960
- S. *surinamensis* Dusbabek and Lukoschus, 1971

Group III
- S. *subacuminatus* Furman, 1966

Phenetic and Host-Parasite Relationships

The above proposed classification of Venezuelan Spinturnicidae is based on morphological similarities and host-parasite relationships. The major species groupings follow the classification of the chiropteran hosts quite closely. That is to say, there is a high degree of correlation between the proposed classification of the Spinturnicidae and the currently accepted classification of the Chiroptera. This is illustrated well in Table I, which gives the frequency of occurrence of each species of spinturnicid mite on each family or subfamily of Chiroptera collected by the Smithsonian Venezuelan Project, and in Appendix I, which gives the frequency of occurrence of each species of spinturnicid mite on each species of bat collected in Venezuela. The species of mites are listed according to the proposed classification and the families of bats are listed according to the currently accepted classification. No spinturnicid mites were collected from bats of the families Furipteridae and Thyropteridae.

Species of the spinturnicid mite genus *Cameronieta* occur primarily on bats of the family Mormoopidae. Prior to Machado-Allison's (1965b) description of the genus *Cameronieta*, *C. strandtmanni* was included in the genus *Periglischrus*. Also, until recently, genera of the Chiroptera family Mormoopidae constituted a subfamily of the family Phyllostomidae.

The genus *Periglischrus* is divided into four major groups, most of which parasitize bats of the family Phyllostomidae. The species of Group I occur primarily on bats of the subfamily Phyllostominae; those of Group II on the subfamily Glossophaginae (with the exception of *P. herrerai*, which occurs primarily on bats of the subfamily Desmodontinae); those of Group III on the subfamilies Carolliinae, Sturnirinae, and Stenodermatinae; and the one species of Group IV, *P. natali*, occurs on the family Natalidae. The subgroupings of the mites of Groups I and

Table 1. Frequency of occurrence of spinturnicid mites on families and subfamilies of bats in Venezuela

	Family or Subfamily of Bats				
Species of Mite	Emballonuridae (1062)*	Noctilionidae (622)	Mormoopidae (870)	Phyllostominae (2382)	Glossophaginae (3151)
C. strandtmanni			8(51)**		
C. elongatus			76(338)	2(5)	1(1)
C. thomasi			3(3)		
P. parvus				7(18)	
P. micronycteridis				13(42)	
P. gameroi			1(1)	34(51)	
P. tonatii n. sp.				10(54)	
P. paracutisternus				35(103)	1(11)
P. acutisternus			2(2)	207(566)	
P. dusbabeki				22(68)	
P. grandisoma n. sp.				5(24)	
P. torrealbai	1(1)			161(442)	2(2)
P. paratorrealbai n. sp.				5(46)	
P. caligus			1(2)	1(1)	216(579)
P. paracaligus n. sp					54(190)
P. paravargasi n. sp.				2(5)	55(154)
P. vargasi					67(191)
P. hopkinsi					8(16)
P. herrerai					1(1)
P. ojastii		1(2)		6(6)	5(7)
P. ramirezi					
P. iheringi	1(4)	2(3)	6(6)	8(11)	9(15)
P. natali					
S. americanus	1(2)				
S. bakeri					
S. surinamensis					
S. subacuminatus					
TOTAL	3(7)	3(5)	97(392)	518(1442)	419(1170)

*The numbers in parentheses beneath the family or subfamily of bats represents the total bats of that family or subfamily collected.

**The number of collections of each species of mite is followed by a number in parentheses which represents the number of specimens collected.

Table 1. - Continued

	Family or Subfamily of Bats			
Species of Mite	Carolliinae (4942)	Sturnirinae (3037)	Stenodermatinae (8640)	Desmodontinae (951)
C. strandtmanni				
C. elongatus	1(1)	4(4)		
C. thomasi				
P. parvus				
P. micronycteridis	1(1)			
P. gameroi			1(1)	1(2)
P. tonatii n. sp.				1(1)
P. paracutisternus				
P. acutisternus	1(3)	1(1)	6(13)	2(14)
P. dusbabeki				
P. grandisoma n. sp.				
P. torrealbai	1(10)		6(7)	1(6)
P. paratorrealbai n. sp.				
P. caligus		1(1)	2(3)	4(4)
P. paracaligus n. sp.				
P. paravargasi n. sp.				
P. vargasi				
P. hopkinsi				
P. herrerai		3(3)		62(115)
P. ojastii	3(7)	659(1881)	12(33)	4(11)
P. ramirezi	22(78)			
P. iheringi	14(39)	15(37)	1578(4706)	5(6)
P. natali				
S. americanus				
S. bakeri				
S. surinamensis				
S. subacuminatus				
TOTAL	43(139)	683(1927)	1605(4763)	80(159)

Table 1. - Continued

	Family or Subfamily of Bats				
Species of Mite	Natalidae (186)	Furipteridae (6)	Thyropteridae (11)	Vespertilionidae (773)	Molossidae (1583)
C. strandtmanni					
C. elongatus					
C. thomasi					
P. parvus					
P. micronycteridis					
P. gameroi				1(1)	
P. tonatii n. sp.					
P. paracutisternus				1(1)	
P. acutisternus				1(1)	1(1)
P. dusbabeki					
P. grandisoma n. sp.					
P. torrealbai				1(1)	1(1)
P. paratorrealbai n. sp.					
P. caligus					
P. paracaligus n. sp.					
P. paravargasi n. sp.					
P. vargasi					
P. hopkinsi					
P. herrerai					
P. ojastii					
P. ramirezi					
P. iheringi				4(4)	2(2)
P. natali	4(5)				
S. americanus				136(381)	1(1)
S. bakeri				19(49)	
S. surinamensis				9(17)	
S. subacuminatus				90(289)	
TOTAL	4(5)	0(0)	0(0)	262(744)	5(5)

II are based primarily on morphological similarities and differences; however, there are also striking correlations between the arrangement based on phenetic similarities and the host-parasite associations. The morphological similarities between the species of the several subgroups may be seen by examining the identification key to females, the illustrations of female sternal plates (Fig. 1-20), and the descriptions of individual species.

The four species of *Spinturnix* occur almost entirely on Chiroptera of the family Vespertilionidae, subfamily Vespertillioninae. More detailed discussions of host specificity and phenetic relationships will be presented in the treatment of genera and species.

Key to Genera of New World Spinturnicidae

1. Two dorsal plates, sometimes very delicately sclerotized; lacking tritosternum; peritremes very long, extending from level of coxa IV to level of coxa I 2

Single dorsal plate; tritosternum usually present, rarely reduced or lacking; peritremes short, lying over coxa III, usually with anterior end bent ventrad 3

2(1). Sternal plate wider than long, either fused to or in contact with coxae I; ventral anterolateral integument with many small thornlike mammalations; anterior and posterior parts of dorsal plate fused by suture or completely separated; anus dorsal and subterminal; camerostome present; from bats of family Mormoopidae .... *Cameronieta* Machado-Allison (p. 5)

Sternal plate longer than wide, separated from coxae I; ventral anterolateral integument smooth; anterior and posterior parts of dorsal plate connected by two bridges; anus ventral, terminal; camerstome absent; primarily from bats of family Phyllostomidae .... *Periglischrus* Kolenati (p. 9)

3(1). Peritremes completely dorsal; from anal orifice of *Myotis* spp .... *Paraspinturnix* Rudnik

Peritremes with anterior end bent ventrad; from bats of the family Vespertilionidae .... *Spinturnix* Von Heyden (p. 61)

Genus *Cameronieta* Machado-Allison

Cameronieta Machado-Allison. 1965b, Acta Biol. Venezuelica. 4(10): 243-258.

Type species: *Cameronieta thomasi* Machado-Allison, 1965b.

Description

Dorsal plate divided; anterior and posterior parts fused by suture or completely separated. Five pairs of propodosomal setae lateral to dorsal plate; single metapodosomal seta adjacent to each stigma. Peritremes long, completely dorsal, extending from level between coxae III and IV to level of coxa I. Camerostome present anteriorly over gnathosoma. Dorsal opisthosoma with few to many small setae. Tritosternum absent. Sternal plate wider than long; fused to or in contact with coxae I; with three pairs of setae usually on medial surface of plate rather than on margins. Ventral anterolateral integument with many small thornlike mammalations. One pair of metasternal setae posterior to sternal plate of female. Holoventral plate of male with five pairs of setae and two pairs of pores. Genital plate of female small and elongate; with pair of small to large setae on or near posterior margin. Ventral integument, between genital plate and caudal portion of idiosoma, with several small to moderately large setae. Anal plate dorsal and subterminal. Legs short and stout, with ventral setae medium in size and some pectinate.

Remarks

The genus *Cameronieta* was originally erected and described by Machado-Allison (1965b) to include a single species, *C. thomasi*. Subsequently, there has been controversy regarding the validity of this genus. Furman (1966) concluded that *Cameronieta* was a synonym of *Periglischrus*, and further hypothesized that *C. thomasi* was a heteromorph of *C. elongatus*. A year later, Dusbabek (1967) recognized *Cameronieta* as a valid genus, described three new species from Cuba, and presented keys for identification of five of the six known species; he omitted *C. elongatus* no doubt because Furman's (1966) paper was unknown to him. Machado-Allison and Antequera (1971) issued a rebuttal to Furman's (1966) conclusions and presented additional evidence supporting the validity of the genus *Cameronieta*. The two abnormal female specimens reported by Furman (1966:133) from *Pteronotus parnellii fuscus* in Panama were undoubtedly identical to the adult female of *C. thomasi* as described by Machado-

Allison. On the other hand, it is apparent that Machado-Allison (1965b) also included *C. elongatus* in his forms described as *C. thomasi*. Thus, his "female deutonymph" appears to be an adult of *C. elongatus*. To avoid further confusion, we have chosen to follow Machado-Allison (1965b), Machado-Allison and Antequera (1971), and Dusbabek (1967) in recognizing the validity of the genus *Cameronieta.*

Mites of the genus *Cameronieta* are restricted to the New World tropics and subtropics. Species of this genus have been recorded primarily from bats of the family Mormoopidae. At present the genus *Cameronieta* is known to include six species: *C. machadoi, C. torrei,* and *C. tibbettsi,* which were described by Dusbabek (1967) from bats of the genus *Chilonycteris* (=*Pteronotus*) in Cuba, and *C. elongatus, C. strandtmanni,* and *C. thomasi,* which are recorded herein from Venezuela. *C. elongatus* was originally described by Furman (1966) from Panama; *C. strandtmanni* was reported originally by Tibbetts (1957) from *Mormoops megalophylla* in Texas, and later by Furman (1966) from the same host species in Trinidad; and *C. thomasi* is known only from Venezuela. We have not examined specimens of the three Cuban species described by Dusbabek (1967). However, after reviewing original descriptions, illustrations, and host records, we consider it possible that *C. tibbettsi* is a synonym of *C. elongatus.*

Key to Species of Venezuelan *Cameronieta*

Females

1. Venter of legs with simple, smooth to sparsely pectinate setae; from *Mormoops* spp. .... *C. strandtmanni* (Tibbetts, 1957) (p. 6)
   Venter of legs with prominent palmate setae 2

2(1). Small species (less than 1,200μ long); with idiosoma elongate; width of sternal plate less than two times its length, with second and third pairs of setae located near posterior margin; femur I with two prominent palmate setae ventrally; from *Pteronotus* spp. .... *C. elongatus* (Furman, 1966) (p. 7)
   Large species (length greater than 1,200μ); with idiosoma not unusually elongate, width of sternal plate more than three times its length, with second and third pairs of setae at about midlength of plate; femur 1 with four prominent palmate setae ventrally: from *Pteronotus parnellii* .... *C. thomasi* Machado-Allison, 1965b (p. 9)

Males

1. Large species (dorsal plate length greater than 300 μ); posterior quarter of dorsal plate separated from anterior portion by suture; from *Pteronotus* spp. .... *C. thomasi* Machado-Allison, 1965b (p. 9)
   Small species (dorsal plate length less than 300 μ); posterior quarter of dorsal plate distinctly separated from anterior portion by nonsclerotized cuticula 2

2(1). Distal seta of coxa I normal, slender; proximal anterdorsal seta of femur II small to medium-sized; first and second pairs of podosomal setae close together, distance between first and second about half that between second and third .... *C. elongatus* Furman, 1966 (p. 8)
   Distal seta of coxa I enlarged, robust and spinelike; proximal anterodorsal seta of femur II minute; first and second pairs of podosomal setae rather widely separated, distance between first and second equal to that between second and third .... *C. strandtmanni* Tibbetts, 1957 (p. 7)

Cameronieta strandtmanni (Tibbetts, 1957)

Periglischrus strandtmanni Tibbetts, 1957: 14-19.
Cameronieta strandtmanni Dusbabek, 1967: 149, 158-160.

Description

Female: Idiosomal length, 857 μ; greatest width, 499 μ. Sternal plate distinctly wider than long (median length, 88 μ; greatest width, 127 μ); anterior margin broadly concave; anterolateral corners rounded, in close juxtapositiion to coxae I; lateral margins of plate with small acute projections; plate very broadly rounded posteriorly; first sternal setae set in slightly from anterior margin; second sternal setae on posterolateral margins; third setae more medial near posterior margin; sternal setae small, slender (length 15-17 μ): metasternal setae minute (length less than 13 μ), located directly posterior to sternal plate. Integument lateral and posterior to sternal plate with many small spinelike mammalations. Genital plate enlarged; lightly sclerotized anteriorly; heavily sclerotized, quite narrow and elongate posteriorly. Genital setae slender, medium length (21-22 μ), close together on posterior end of plate. Ventral opisthosoma with 10 pairs of setae; first 3 anteriormost pairs minute (length less than 6 μ); other 7 pairs rather small, slender (length 9-15 μ). Dorsal plate oblong-oval in general overall shape (median length, 302 μ; greatest width, 208 μ); anterior end narrows to blunt apex; plate distinctly divided posteriorly with smaller posterior section separated by rather broad transverse band of lightly sclerotized integument; plate ornamented with several medium-sized irregularly circular areas. Six pairs of slender podosomal setae lateral to dorsal plate; first pair smaller and more slender (length 24-27 μ), located anterolateral to dorsal plate at level of anterior end of peritremes; other 5 pairs larger (length 41-58 μ), middle 4 pairs located laterally between dorsal plate and peritremes, sixth pair adjacent medially to stigmata. Dorsal opisthosoma with 7 pairs of medium length (15-35 μ) setae. Most dorsal and lateral leg setae of medium length, those of tarsi smaller; proximal setae of femora distinctly longer. Ventral leg setae small to medium-sized, some rather robust with fine slender barbs.

MALE: Median length of idiosoma, 314 μ; greatest width 255 μ. Holoventral plate spade-shaped (median length, 126 μ; greatest width, 101 μ); covering large portion of venter between coxae; five pairs of setae of holoventral plate small to medium-sized (length 19-37 μ); first and second pairs considerably longer than others, first pair extends posteriorly beyond level of first pair of pores. Soft integument of venter lateral and posterior to holoventral plate with numerous small, spinelike mammalations. Intercoxa IV area with six pairs of setae plus pair of subterminal adanal setae; first pair quite small (length 17-31 μ). Dorsal plate generally oval with narrower anterior end (median length, 281 μ; greatest width, 212 μ); posterior quarter distinctly divided and separated from anterior portion by narrow band of soft integument. Six pairs of medium-sized (length 15-39 μ) podosomal setae lateral to dorsal plate; first pair located anterior to peritremes near anterolateral margins of dorsal plate; middle four pairs located laterally between dorsal plate and peritremes; distance between second and third pairs twice that between third and fourth pairs, and between fourth and fifth pairs; sixth pair located adjacent to stigmata. Most coxal setae medium length, slightly enlarged basally, with distal half slender; distal seta of coxa I very robust, spinelike; posterolateral seta of coxa II long, slender. Most ventral leg setae small to medium-sized, slender; some enlarged somewhat basally. Antero- and posterolateral setae slender, mostly small or medium-sized, some recurved. Distal posterodorsal seta of femur I and II unusually long, slender; most other dorsal leg setae medium-sized to moderately long, except proximal anterodorsal seta of femur II minute.

VENEZUELAN RECORDS (49 females, 1 male, and 1 protonymph): Except for one December collection from Yaracuy, all collections (8) were from *Mormoops megalophylla* from Falcón in July.

REMARKS: *C. strandtmanni* differs from all other described species of the genus in the size and form of many ventral leg setae; that is, in the female all ventral leg setae are small, simple, and setaceous; none are prominently palmate. All other species of the genus have larger, prominent, palmate setae on the venter of the legs of the females. In the male of *C. strandtmanni* the distal seta of coxa I is greatly enlarged and spinelike, whereas in all other species this seta is more slender and setaceous. This species has been collected only from *Mormoops megalophylla* in Texas (Tibbetts, 1957), Trinidad (Furman, 1966), and Venezuela.

Cameronieta elongatus (Furman, 1966)

Periglischrus elongatus Furman, 1966: 130-133

DESCRIPTION

FEMALE: Idiosomal length, 941 μ; greatest width, 415 μ. Sternal plate somewhat wider than long (median length, 99 μ; greatest width, 106 μ); anterior margin medially concave between first sternal setae, first sternal setae set in from margins on anterolateral portions of plate; anterolateral margins concave, fitting closely contour of coxae I but not joined; posterior margin very broadly rounded with second and third sternal setae set in horizontal row relatively close to posterior margin; sternal setae small, slender (length 12-17 μ); metasternal setae minute (length less than 9 μ); located directly posterior to sternal plate. Integument lateral and posterior to sternal plate with many small, spinelike mammalations. Genital plate enlarged anteriorly; quite narrow, elongate posteriorly; genital setae slender, medium length (34-35 μ), set close together on posterior end of plate. Ventral opisthosoma with 11 pairs of setae, anteriormost 6 pairs small, slender (length 8-14 μ); most set on small platelets bearing pair of posterolaterally directed minute spines; remaining 5 pairs of posterior and posterolateral setae larger (length 18-33 μ), coarsely barbed to slightly palmate. Dorsal plate oblong-oval in general overall shape (median length, 288 μ; greatest width, 178 μ); anterior end narrows, forming blunt apex; plate distinctly divided posteriorly with small posterior section separated by rather broad transverse band of lightly sclerotized integument. Six pairs of moderately large (length 25-43 μ) podosomal setae lateral to dorsal plate; first pair located anterolateral to plate anterior to end of peritremes; middle 4 pairs located laterally between dorsal plate and peritremes; sixth pair located adjacent to stigmata. Dorsal opisthosoma with 7 pairs of small to medium-lengthed (14-35 μ), slender setae. Most dorsal and lateral leg setae small to medium sized, longer setae with slender recurved ends; one proximal dorsal seta of each femur distinctly longer than other leg setae; one row of ventral leg setae medium in length, distinctly palmate; other ventral leg setae smaller, more slender.

Male: Median length of idiosoma, 299 μ; greatest width, 254 μ. Holoventral plate spade shaped (median length, 139 μ; greatest width, 115 μ); covering most of venter between coxae. Five pairs of holoventral setae small to medium sized (length 18-33 μ); first pair longest, extending posteriorly just beyond level of first pair of pores. Soft integument of venter lateral and posterior to holoventral plate with numerous small, spinelike mammalations. Intercoxa III-IV area with six pairs of setae plus pair of subterminal adanal setae; all seven pairs rather small (length 12-26 μ). Dorsal plate generally oval (median length, 28 μ; greatest width 207 μ); posterior quarter distinctly divided and separated from anterior portion by narrow band of soft integument. Six pairs of medium-sized (length 24-35 μ) podosomal setae lateral to dorsal plate; first two pairs close together anterior to peritremes near anterolateral margins of dorsal plate; middle three pairs located laterally between dorsal plate and peritremes; sixth pair located adjacent to stigmata. Coxal setae all medium in length, slender, except for slightly enlarged bases on some; most ventral leg setae small to medium in length, some may be enlarged basally; antero- and posterolateral setae small to medium sized, some recurved. Distal posterodorsal seta of each femur I-IV unusually long, slender; most other dorsal leg setae medium in length, slender to slightly enlarged basally.

Venezuelan Records (172 females, 80 males, 17 deutonymphs, 35 protonymphs, and 45 specimens in alcohol): Of the 83 collections, 75 were from bats of the genus *Pteronotus* (*P. parnellii*, 37; *P. davyi*, 28; *P. suapurensis*, 10). Three collections were from *Sturnira lilium*, and one each was from *Macrophyllum macrophyllum*, *Sturnira tildae*, *Anoura geoffroyi*, *Carollia perspicillata*, and *Phylloderma stenops*. Collections were made in the following states and districts: Yaracuy (46), T. F. Amazonas (13), Bolívar (12), Falcón (5), Sucre (3), Nueva Esparta (2), Monagas (1), and Dto. Federal (1), at elevations ranging from 1 to 1524m, with a majority (47) at elevations near 400m. Collections were made in all months of the year except March, August, and October, with most in December (46), April (20), and July (6).

Remarks: *C. elongatus* is easily distinguished from *C. strandtmanni* and *C. thomasi*. It differs from *C. strandtmanni* in having prominent palmate setae on the venter of the legs in the female and in the male by the simple, setaceous distal seta of coxa I. It differs from *C. thomasi* in being considerably smaller and more elongate (twice as long as wide); in the female, femur I has only two palmate setae ventrally, and the second and third sternal setae are located near the posterior margin of the plate; in the male the posterior quarter of the dorsal plate is distinctly separated from the anterior portion. *C. elongatus* appears to be quite similar to the three species described by Dusbabek (1967) from Cuba. It differs from *C. machadoi* and *C. torrei* in the form of the dorsal plate, particularly the posterior section, which is separated from the anterior portion; also the species of the host differ. Based on Dusbabek's (1967) illustrations and description, *C. tibbettsi* Dusbabek appears to be a synonym of *C. elongatus*. Both are recorded from the same species of host. However, until type specimens of both species can be compared, these two species must be considered valid.

C. elongatus was originally described from material collected from "*Chilonycteris rubiginosa fusca*" (= *Pteronotus parnellii fuscus*) in Trinidad and was also reported from *Pteronotus parnellii fuscus* and *P. suapurensis* in Panamá (Furman, 1966). As noted previously, Machado-Allison's (1965b) "female deutonymph" of *C. thomasi* is apparently an adult female of *C. elongatus*, and the two abnormal females of

C. elongatus reported by Furman (1966) are identical to the adult female of *C. thomasi.* As noted in the Venezuelan records, most collections were from three species of *Pteronotus.* The other eight collections, from six different hosts, may represent accidental host-parasite associations or contamination of collections.

Cameronieta thomasi Machado-Allison, 1965

Cameronieta thomasi Machado-Allison, 1965b: 244-258

Description

Female: Idiosomal length, 1850 μ; greatest width, 1106 μ. Sternal plate distinctly broader than long (median length, 306 μ; greatest width, 239 μ); anterior margin concave between and lateral to first sternal setae; first sternal setae on margin; anterolateral margins appear fused to coxae I; posterior margin very broadly rounded; second sternal setae widely separated posterolaterally on surface of plate; third sternal setae rather close together medially between second sternal setae; metasternal setae located posterior to sternal plate directly behind second sternal setae; sternal setae as well as genital setae medium sized (length 33-59 μ). Integument lateral and posterior to sternal plate with many small, spinelike mammalations. Genital plate enlarged, almost spherical, anteriorly, with elongate narrow posterior portion; genital setae on plate near posterior end. Ventral opisthosoma with 13 pairs of small to moderately large setae; anteriormost 6 or 7 pairs shorter (length 20-34 μ); 5 posteriormost pairs larger (length 54-66 μ); sixth pair of medial setae distinctly barbed. Dorsal plate oval (medial length, 570 μ; greatest width, 395 μ); greatest width near midpoint; posterior end of dorsal plate superficially divided from anterior portion by narrow transverse suture. Six pairs of rather large (length 59-94 μ) podosomal setae located lateral to dorsal plate in 3 groups of 1, 4, and 1; first pair near anterior end of plate, middle 4 pairs equidistant from each other laterally between dorsal plate and peritremes, sixth pair medial to stigmata. Dorsal opisthosoma with 7 pairs of smaller setae (length 52-94 μ). Dorsal leg setae generally elongate, moderately enlarged basally, attenuate proximally. Many medial ventral leg setae enlarged, flattened, prominently palmate; more lateral ventral setae coarsely barbed, not so enlarged, flattened, and palmate.

Venezuelan Records (3 females): All collections (3) were made in April from *Pteronotus parnellii* in Bolívar (2) and T. F. Amazonas (1). Specimens of *C. elongatus* were also taken in these same 3 collections.

Remarks: *C. thomasi* differs quite strikingly from other species of the genus, primarily in size. It is much larger than any other species in both length and width of the idiosoma. Also, the second and third sternal setae are located near the midway point of the length of the plate, and the posterior quarter of the dorsal plate is not separated from the anterior portion. Collection records reveal that *C. thomasi* and *C. elongatus* may occur on the same species of host. It is now evident that the two abnormal female specimens reported by Furman (1966) as *C. elongatus* are identical to the adult female of *C. thomasi*, and the "female deutonymph" described by Machado-Allison (1965b) as *C. thomasi* is an adult of *C. elongatus.*

Genus *Periglischrus* Kolenati

Periglischrus Kolenati, 1857, Wien. Ent. Monatschr., 1(2): 60.

Type species: *Periglischrus caligus* Kolenati, 1857, by subsequent designation (Oudemans, 1903, Tijdschr. Ent., 45:135).

Description

Dorsal plate usually superficially divided by partial suture line or transverse band of lightly sclerotized integument but with posterior quarter joined to anterior portion by two narrow bridges. Six pairs of podosomal setae lateral to dorsal plate, with sixth pair located slightly posterior to stigmata. Peritremes dorsal in position and long, extending from level of coxa IV to level of coxa I, and lying over coxa II and III. Dorsal opisthosoma with several pairs of minute to medium-length setae.

Opisthosoma of female greatly expansile relatively flat, broad, and fan shaped. Tritosternum absent. Sternal plate of female usually longer than wide, with three pairs of setae on or off margins. Pair of metasternal setae located posterior to sternal plate. Holoventral plate of male covers most of venter between coxae I-III, with five pairs of setae and two pairs of pores. Genital plate of female reduced and narrow, with pair of small setae close to or on posterior margin. Ventral opisthosoma of female has curiously shaped areas of heavy sclerotization. Ventral integument between genital plate and posterior margin bears several small setae. Anal plate small, narrow, terminal, and with pair of small ventral subterminal adanal setae and minute dorsal postanal seta. Intercoxa IV area of male bears several pairs of setae, including adanal pair. Legs relatively short and stout, with large claws and caruncles. Ventral leg setae short, with dorsal and lateral setae short to long.

Dorsum of deutonymphs (both female and male) similar in most characters to those of adult female and male (*i.e.*, superficially divided dorsal plate, long dorsal peritremes, and 6 pairs of podosomal setae lateral to dorsal plate). Dorsum of protonymph differs from those of adults as follows: peritreme short, about one-third as long as those of deutonymphs and adults; only 5 pairs of podosomal setae (sixth pair absent). Female deutonymph, male deutonymph, and protonymph differ most in ventral characters. All have 3 pairs of sternal setae on sternal plate, but setae somewhat smaller in protonymph and female deutonymph than in male deutonymph. Female and male deutonymphs bear pair of metasternal setae and pair of genital setae, both absent in protonymph. Primary difference between immature forms is in number of intercoxa IV setae: protonymph bears 4 pairs, plus 1 pair of adanal setae; male deutonymph bears from 7 to 9 pairs, plus pair of adanal setae; and female deutonymph bears from 10 to 12 pairs, plus pair of adanal setae. In all immature forms, first pair of intercoxa IV setae distinctly smaller than other pairs. Coxal and leg setae generally similar in all immature stages, except that in protonymph certain leg setae absent.

Remarks: The genus *Periglischrus* was described by Kolenati (1857) to accommodate a single species, *P. caligus*. Species of this genus have been reported primarily from New World bats belonging to the family Phyllostomidae. The best known and least host-specific species of *Periglischrus* is *P. iheringi* Oudemans, 1902. In 1944 Hoffmann described *Periglischrus vargasi* from *Leptonycteris nivalis* and *Anoura geoffroyi*. Thus, at the time of Rudnick's (1960) revision of the family Spinturnicidae, only three species which are currently recognized as *Periglischrus* had been described.

Based on collections of more than 1,000 specimens of Chiroptera from Venezuela, Machado-Allison (1964, 1965a) studied the host-parasite relationships of members of the genus *Periglischrus*. As a result of these studies, he described 6 new species. Almost simultaneously, Furman (1966) completed a study of spinturnicid mites of Panamá, and presented descriptions of 6 new species, 4 of which had been described by Machado-Allison (1964, 1965a). The most recent publication on Venezuelan *Periglischrus* is that of Machado-Allison and Antequera (1971) in which 4 more new species were described.

In studies of Cuban spinturnicid mites, Dusbabek (1968) described two new species of *Periglischrus* (*P. delfinadoae* and *P. cubanus*) and one new genus, *Mesoperiglischrus*, with a single new species, *M. nyctiellinus*. We have not had an opportunity to examine specimens of the two new species of *Periglischrus*, but based on Dusbabek's descriptions, illustrations, and host records, we recognize these species as valid until further studies can be made and the types examined. The illustrations of the female of *P. delfinadoae* resemble *P. ojastii* Machado-Allison, 1964, and the illustrations of *P. cubanus* resemble *P. caligus* Kolenati, 1857. Based on the illustrations, descriptions, and host records, *Mesoperiglischrus nyctiellinus* Dusbabek, 1968, is considered here to be a synonym of *P. natali* Furman, 1966.

Of the 17 previously described, valid species of *Periglischrus* of tropical and subtropical America, 15 have been collected from bats in Venezuela. In addition to these 15 species, 5 new species were collected by the Smithsonian Venezuelan Project and are described herein.

Most species of the genus *Periglischrus* are quite host specific, as indeed are most species of other genera of bat mites. Based on morphological similarities and host-parasite associations, *Periglischrus* can be divided into several groups (see Table 1). Group 1, parasites primarily on bats of the subfamily Phyllostominae, includes 10 species in 3 subgroups on the basis of phenetic similarities: subgroup A includes *P. parvus*, *P. micronycteridis*, and *P. gameroi*; subgroup B contains *P. tonatii* n. sp., *P. paracutisternus*, *P. acutisternus*, *P. dusbabeki* and *P. grandisoma* n. sp.; and subgroup C is composed of *P. torrealbai* and *P. paratorrealbai* n. sp. The second major group is formed by those primarily parasitic on bats of the subfamily Glossophaginae: *P. caligus*, *P. paracaligus* n. sp., *P. paravargasi* n. sp., and *P. vargasi* form a phenetically similar subgroup; and *P. hopkinsi* and *P. herrerai* form another morphologically similar subgroup. However, *P. herrerai* is found primarily on *Desmodus rotundus* of the bat subfamily Desmodontinae. *P. ojastii*, *P. ramirezi*, and *P. iheringi* form another major phenetic group and are primarily parasitic on genera and species of the bat subfamilies Sturnirinae, Carolliinae, and Stenodermatinae, respectively. *P. natali* is reported only from species of the bat genus *Natalus*, family Natalidae and, based on morphological characters, is not considered to be phenetically similar to any of the other groups. However, it does possess characters in common with a number of species of *Periglischrus*.

The degree of host specificity among the species of this genus is quite striking. Table 2 summarizes the host specificity based on the Venezuelan Project records. Ten of the 20 species are basically monoxenous; that is, each occurs on a single chiropteran species and thus are considered to be highly specific. Eight of the remaining 10 species are considered to be basically stenoxenous, occurring on species of a single genus of bats, and are thus less host specific. Two species, *P. ojastii* and *P. iheringi*, are more or less oligoxenous and polyxenous, occurring on species of bats of two or more genera, and thus seem to have a rather low host specificity. Certain species which are considered to be basically stenoxenous were recorded from hosts of other genera. However, throughout this study the accidental contamination of collections has been considered quite probable, especially in cases where a single specimen of a mite species is recorded from an unusual host for the species (See Appendix I).

The 2 species of the *Periglischrus* Group I, subgroup C, *P. torrealbai* and *P. paratorrealbai* n. sp., are synoxenous with 2 species of subgroup B, *P. acutisternus* and *P. grandisoma* n. sp., respectively. That is *P. torrealbai* and *P. acutisternus* occur on the same host (species of the genus *Phyllostomus*), and *P. paratorrealbai* n. sp. and *P. grandisoma* n. sp. occur on the same host (*Phylloderma stenops*). Of the 217 collections of *P. acutisternus* and 173 collections of *P. torrealbai*, 107 collections contained specimens of both species. That is, 107 of the 217 (49.3 percent) collections of *P. acutisternus* also contained *P. torrealbai*, and 107 of the 173 (61.8 percent) collections of *P. torrealbai* also contained *P. acutisternus*. Of the 5 collections of *P. grandisoma* n. sp. and 5 collections of *P. paratorrealbai* n. sp., 4 contained specimens of both species.

The following keys for identification generally reflect phenetic similarities and host-parasite relationships, but they are restricted to females and males of *Periglischrus;* the immature forms (male and female deutonymphs and protonymphs) cannot be easily separated on morphological characters. Identification of immature forms in the present study was made by association with females and males in the same collection and by host-parasite associations. Accompanying the key to females are illustrations (Fig. 1-20) of the sternal plates of all species. It has been found that females of almost all species of *Periglischrus* may be easily identified by the relative size and shape of the sternal plate.

Table 2. Host specificity of species of *Periglischrus* collected in Venezuela.

	Host Specificity[1]				
Species	Monoxenous	Stenoxenous	Oligoxenous	Polyxenous	Synoxenous
P. parvus	X				
P. micronycteridis		X			
P. gameroi		X			
P. tonatii n. sp.		X			
P. paracutisternus	X				
P. acutisternus		X			X
P. dusbabeki	X				
P. grandisoma n. sp.	X				X
P. torrealbai		X			X
P. paratorrealbai n. sp.	X				X
P. caligus		X			
P. paracaligus n. sp.	X				
P. paravargasi n. sp.		X			
P. vargasi		X			
P. hopkinsi	X				
P. herrerai	X				
P. ojastii			X	X	
P. ramirezi	X				
P. iheringi			X	X	
P. natali	X				

[1] Monoxenous = occurs on single host species
Stenoxenous = occurs on species of single host genus
Oligoxenous = occurs on hosts of two or more genera
Polyxenous = very low host-specificity
Synoxenous = species of parasites of same genus occurring on same host

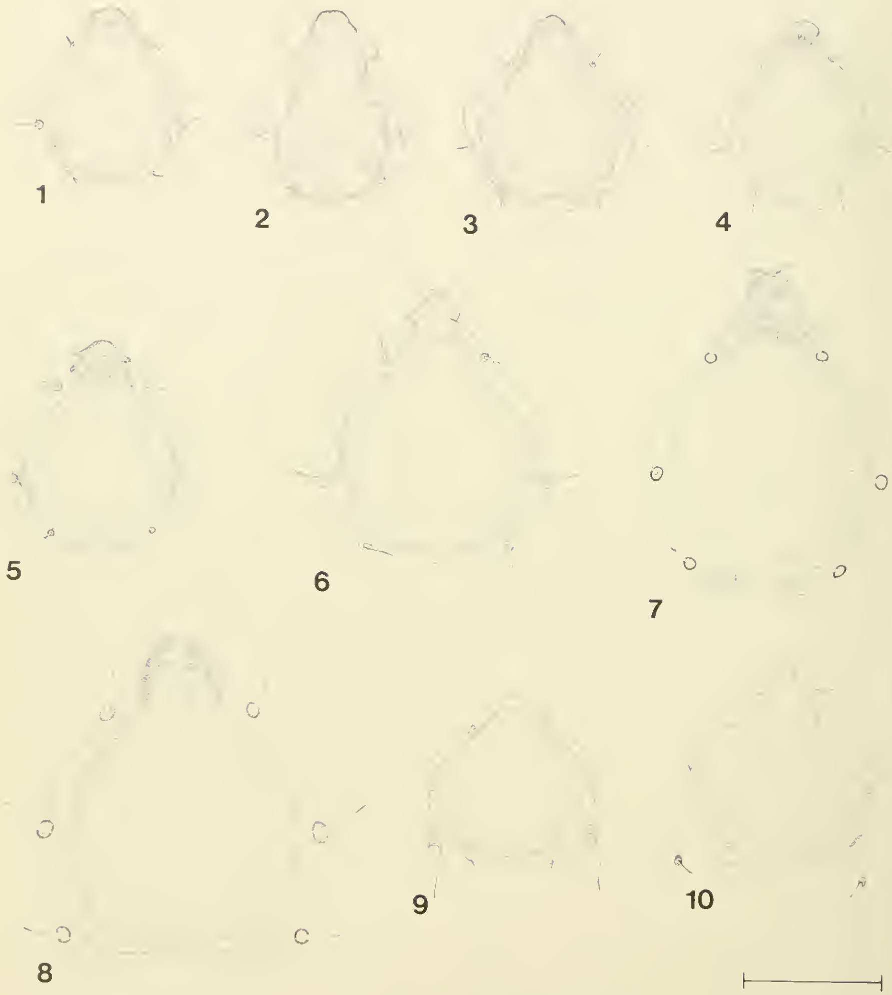

Fig. 1-10. Sternal plates of *Periglischrus*, females. (1) *P. parvus* Machado-Allison; (2) *P. micronycteridis* Furman; (3) *P. gameroi* Machado-Allison and Antequera; (4) *P. tonatii* n. sp.; (5) *P. paracutisternus* Machado-Allison and Antequera; (6) *P. acutisternus* Machado-Allison; (7) *P. dusbabeki* Machado-Allison and Antequera; (8) *P. grandisoma* n. sp.; (9) *P. torrealbai* Machado-Allison; (10) *P. paratorrealbai* n. sp., scale — 100 μ.

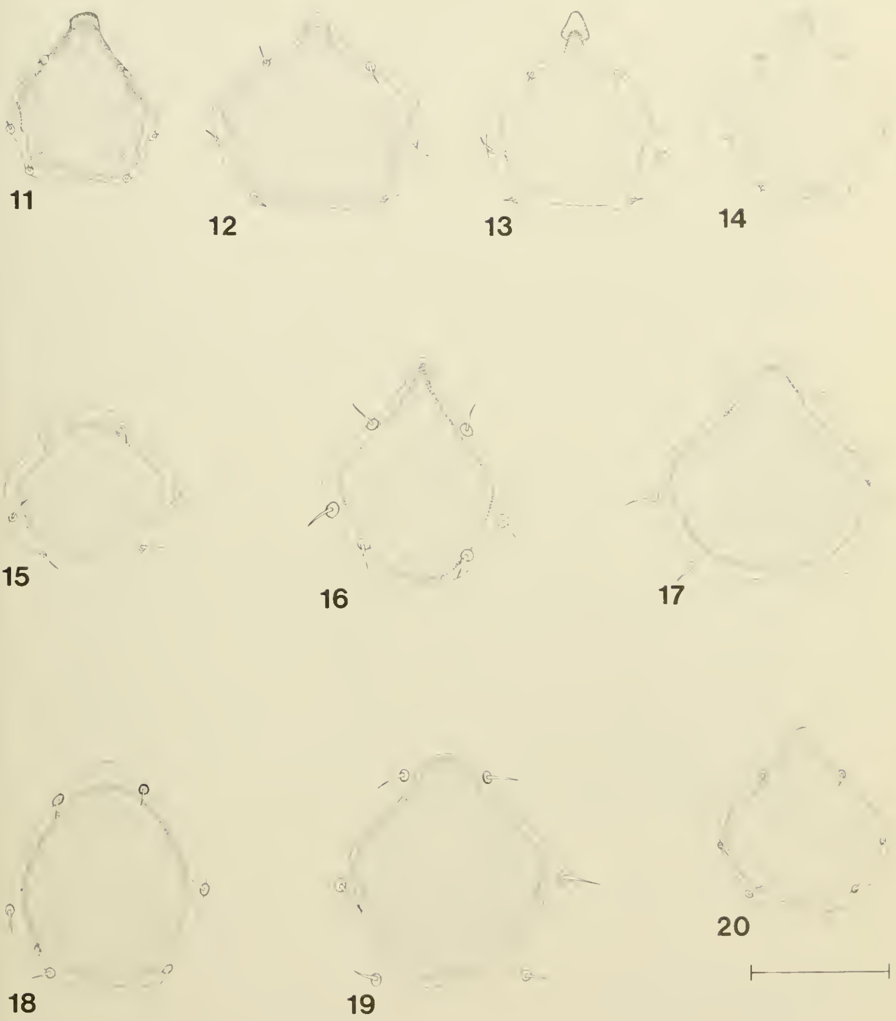

Fig. 11-20. Sternal plates of *Periglischrus*, females. (11) *P. caligus* Kolenati; (12) *P. paracaligus* n. sp.; (13) *P. paravargasi* n. sp., (14) *P. vargasi* Hoffmann; (15) *P. hopkinsi* Machado-Allison; (16) *P. herrerai* Machado-Allison; (17) *P. ojastii* Machado-Allison; (18) *P. ramirezi* Machado-Allison and Antequera; (19) *P. iheringi* Oudemans; (20) *P. natali* Furman, scale = 100 μ.

Key to Species of Venezuelan *Periglischrus*

Females

1. Peritreme of normal size over coxa III and at anterior end, but narrow and threadlike from coxa III to near coxa I; dorsal podosomal setae small to medium sized, with first and second pairs flattened and bladelike; distance between first and second pairs of podosomal setae distinctly greater than distance between second and third pairs; dorsal opisthosoma posterior to coxa IV with six minute setae; from *Natalus* spp. .... *P. natali* Furman, 1966 (p. 60)

Peritreme of normal size throughout; dorsal podosomal setae variable in size and position; however, first and second pairs never flattened and bladelike; number and size of dorsal opisthosomal setae variable 2

2(1). Sternal plate with median anterior projection subtriangular in shape, with distinct constriction anterior to first sternal setae; mediodistal lobe of palpal tibia always large to medium sized and rather prominent; distance between first and second pairs of dorsal podosomal setae always equal to or less than distance between second and third pairs; dorsal podosomal setae all small to medium sized and setaceous 3

Sternal plate with anterior margin variable but never with subtriangular projection and distinct constriction of plate anterior to first pair of setae; mediodistal lobe of palpal tibia variable, usually small to inapparent; distance between first and second pairs of dorsal podosomal setae and size of all dorsal podosomal setae variable 7

3(2). Proximal anterodorsal seta of femur I, patella I, tibia I, femur IV, and proximal posterodorsal setae of femur IV rather large, never small to minute 4

Proximal anterodorsal seta of femur I, patella I, tibia I, femur IV, and proximal posterodorsal seta of femur IV small to minute in size 5

4(3). Very large species (idiosomal length greater than 2,000 μ); one ventral seta on each leg segment, especially legs I and II, flattened with expanded basal portion, slender acute distal portion, and with distinct serrations on side of expansion; one posteroventral seta on each leg segment robust and coarsely serrated on entire surface; mediodistal lobe of palpal tibia medium sized; anterior projection of sternal plate broad (Fig. 8); from *Phylloderma stenops* .... *P. grandisoma* n. sp. (p. 30)

Large species (but idiosoma less than 2,000 μ long); legs I and II without flattened, basally expanded, serrated ventral setae; posteroventral setae of tibia and tarsi I and II inflated basally and recurved, appearing blunt and peglike; posteroventral setae of femur and patella I and II robust and finely serrated on entire surface; mediodistal lobe of palpal tibia large and prominent; anterior projection of sternal plate narrow (Fig. 6); from *Phyllostomus* spp. .... *P. acutisternus* Machado-Allison, 1964 (p. 28)

5(3). Larger species (idiosomal length greater than 1,200 μ); sternal plate with large, elongate anterior projection and with broad angular lateral extensions just anterior to constriction to plate (Fig. 7); from *Mimon crenulatum* .... *P. dusbabeki* Machado-Allison and Antequera, 1971 (p. 30)

Smaller species (idiosomal length less than 1,200 μ); sternal plate with smaller, shorter anterior projection 6

6(5). Sternal plate with broad, short anterior projection, and with angular lateral extensions anterior to constriction (Fig. 5); distal posteroventral seta of femur I, patella I, and femur II flattened, slightly recurved and bearing serrations on posterior concave margin; posteroventral seta of femur IV, patella IV, and tibia IV large, setaceous and recurved; from *Trachops cirrhosus* .... P. *paracutisternus* Machado-Allison and Antequera, 1971 (p. 27)

Sternal plate with short broadly rounded anterior projection without lateral angular extensions (Fig. 4); distal posteroventral seta of femur I, patella I, and femur II not flattened and recurved, may bear fine serrations over entire surface; posteroventral seta of femur IV, patella IV, and tibia IV small, straight, and setaceous; from *Tonatia silvicola* .... *P. tonatii* n. sp. (p. 23)

7(2). Dorsal podosomal setae small to medium in length with distance between first and second pairs always equal to or less than distance between second and third pairs; posteroventral seta of femur IV, patella IV, and tibia IV always setaceous and recurved; one distal posteroventral seta of each tibiae and tarsi I and II inflated basally and recurved, superficially appearing blunt and peglike; proximal posterodorsal seta of femur IV minute 8

Without above combination of characters 10

8(7). Proximal anterodorsal seta of femur I, patella I, and tibia I minute; sternal plate with irregular narrow heavily sclerotized portion, and with wider lateral areas of light sclerotization (Fig. 2); from *Micronycteris* spp. .... *P. micronycteridis* Furman, 1966 (p. 21)

Proximal anterodorsal seta of femur I, patella I, and tibia I larger, medium sized; sternal plate with broad, uniformly heavily sclerotized portion, and with narrow, lightly sclerotized areas bordering plate 9

9(8). Anterior projection of sternal plate bluntly pointed (Fig. 3); larger species (idiosoma usually 1000 μ or more in length); from *Lonchorhina* spp. .... *P. gameroi* Machado-Allison and Antequera, 1971 (p. 21)

Anterior projection of sternal plate broad, angularly pointed (Fig. 1); smaller species (idiosoma usually 900 μ or less in length); from *Micronycteris nicefori* .... *P. parvus* Machado-Allison, 1964 (p. 19)

10(7). Dorsal podosomal setae quite small to minute; at least two pairs of ventral setae posterior to sternal plate grossly expanded basally; some ventral setae of legs I and II short and enlarged (spinelike to peglike) 11

Dorsal podosomal setae variable, small to large but never all unusually small to minute; ventral body setae setaceous, never grossly enlarged basally; ventral setae of legs I and II setaceous 12

11(10). Five pairs of ventral body setae grossly enlarged basally; posteroventral seta of femur IV and patella IV inflated and bladelike; anterior projection of sternal plate broadly rounded (Fig. 9); from *Phyllostomus* spp. .... *P. torrealbai* Machado-Allison, 1965a (p. 34)

Only two pairs of ventral body setae grossly enlarged basally; posteroventral seta of femur IV and patella IV setaceous and recurved; anterior projection of sternal plate narrowly rounded (Fig. 10); from *Phylloderma stenops* .... *P. paratorrealbai* n. sp. (p. 36)

12(10). All dorsal podosomal setae large, long, and robust 13

Dorsal podosomal setae variable, minute to medium in length, first pair usually small to minute 18

13(12). Distance between first and second pairs of dorsal podosomal setae distinctly greater than distance between second and third pairs; proximal anterodorsal seta of femur I, patella I, and tibia I small; anterodorsal seta of tibia II minute 14

Distance between first and second pairs of dorsal podosomal setae equal to or less than distance between second and third pairs; proximal anterodorsal seta of tibia II large 17

14(13). Posteroventral seta of femur IV, patella IV, and tibia IV slender, setaceous, and recurved; ornamentation of dorsal plate consisting of numerous small irregularly round globules; five pairs of dorsal opisthosomal setae small to medium sized;

sclerotized part of sternal plate irregular in shape (Fig. 14); from *Anoura geoffroyi* .... *P. vargasi* Hoffmann, 1944 (p. 52)

Posteroventral seta of femur IV, patella IV, and tibia IV broadly inflated and recurved; ornamentation of dorsal plate consisting of several large irregularly round globules as well as numerous small ones; five pairs of dorsal opisthosomal setae variable in size; sclerotized part of sternal plate more regular in shape 15

15(14). Dorsal opisthosoma with five pairs of small to minute setae posterior to level of coxae IV; anterior end of sternal plate not narrowing so abruptly (Fig. 11); from *Glossophaga* spp. .... *P. caligus* Kolenati, 1857 (p. 40)

Dorsal opisthosoma with six pairs of setae posterior to level of coxae IV, first pair about three times as long as longest of other five pairs, posteriormost two pairs minute, with middle three pairs small to medium length; anterior end of sternal plate narrows abruptly, forming narrow anterior projection 16

16(15). Sternal plate unusually broad, as wide as long, with short, narrowly rounded anterior projection (Fig. 12); from *Leptonycteris curasoae* .... *P. paracaligus* n. sp. (p. 41)

Sternal plate distinctly longer than wide, with longer, narrow, blunt anterior projection (Fig. 13); primarily from *Anoura caudifer* .... *P. paravargasi* n. sp. (p. 46)

17(13). Anterior end of sternal plate broadly rounded, without narrow anterior projection (Fig. 15); six dorsal opisthosomal setae mostly large to medium sized; (first pair just posterior to coxa IV smallest); from *Lionycteris spurrelli* .... *P. hopkinsi* Machado-Allison, 1965a (p. 53)

Anterior end of sternal plate with narrow anterior projection (Fig. 16) extending considerably anterior to first pair of setae; six dorsal opisthosomal setae mostly small in size (first pair just posterior to coxa IV largest); from *Desmodus rotundus* .... *P. herrerai* Machado-Allison, 1965a (p. 55)

18(12). First pair of dorsal podosomal setae subequal in size to other podosomal setae and set on integument off margin of dorsal plate; distance between first and second pairs of podosomal setae equal to or less than distance between second and third pairs; posteroventral seta of femur IV, patella IV, and tibia IV short, straight and bladelike; sternal plate pear shaped (Fig. 17); from *Sturnira* spp. .... *P. ojastii* Machado-Allison, 1964 (p. 56)

First pair of dorsal podosomal setae small to minute and set on anterolateral margins of dorsal plate; distance between first and second pairs of podosomal setae distinctly greater than distance between second and third pairs; posteroventral seta of femur IV, patella IV, and tibia IV variable; shape of sternal plate variable 19

19(18). First pair of dorsal podosomal setae small (never minute) and other podosomal setae medium sized; posteroventral seta of femur IV, patella IV, and tibia IV long, setaceous, and recurved; sternal plate oval in shape (Fig. 18); proximal setae (ad and pd) of femur II both medium sized; from *Rhinophylla pumilio* .... *P. ramirezi* Machado-Allison and Antequera, 1971 (p. 57)

First pair of dorsal podosomal setae minute and other podosomal setae large; posteroventral seta of femur IV, patella IV, and tibia IV straight and bladelike; sternal plate pear shaped (Fig. 19); proximal anterodorsal seta of femur II minute and proximal posterodorsal seta medium sized; from numerous phyllostomid bats, particularly *Artibeus* spp., *Uroderma* spp., and *Vampyrops* spp. .... *P. iheringi* Oudemans, 1902 (p. 58)

Males

1. Peritreme of normal size over coxa III, but narrow and threadlike from coxa III to near coxa I; first two pairs of dorsal podosomal setae minute; proximal seta

minute; proximal seta of coxa I minute, much smaller than distal seta; proximal anterodorsal seta of femur IV small; from *Natalus* spp. .... *P. natali* Furman, 1966 (p. 60)

Peritreme of normal size throughout; dorsal podosomal setae larger, never minute; setae of coxa I variable, but usually longer and subequal in length; proximal anterodorsal seta of femur IV large 2

2(1). Large species (idiosoma length greater than 650 μ); dorsal podosomal setae relatively long (first pair greater than 40 μ long but longest pair less than 60 μ long); proximal posterodorsal seta of femur II long; proximal posterodorsal seta of femur IV small to minute 3

Without above combination of characters 4

3(2). Very large species (idiosoma greater than 700 μ long); ventral setae (sternal and intercoxal) long, extending beyond base of adjacent posterior setae; proximal anterdorsal seta of femur II long; proximal posterodorsal seta of femur IV small; from *Phylloderma stenops* .... *P. grandisoma* n. sp. (p. 32)

Moderately large species (idiosoma less than 700 μ long); ventral setae (sternal and intercoxal) short, not extending near to base of adjacent posterior setae; proximal anterodorsal seta of femur II short; proximal posterodorsal seta of femur IV minute; from *Mimon crenulatum* .... *P. dusbabeki* Machado-Allison and Antequera, 1971 (p. 30)

4(2). Dorsal podosomal setae shorter, longest pair less than 40 μ long; proximal posterodorsal seta of femur IV minute; sternal setae usually longer; proximal seta of coxa I subequal to distal seta 5

Dorsal podosomal setae longer, longest pair usually greater than 40 μ long; proximal posterodorsal seta of femur IV usually small to large; length of sternal setae variable; length of coxa I setae variable 12

5(4). Large dorsal setae of tarsi III-IV superficially smooth, without distinct barbs 6

Large dorsal setae of tarsi III-IV coarsely barbed 9

6(5). Smaller species (idiosomal length less than 325 μ); from *Micronycteris nicefori* .... *P. parvus* Machado-Allison, 1964 (p. 19)

Larger species (idiosomal length greater than 375 μ but less than 425 μ) 7

7(6). First sternal setae short, extending only to first pair of pores; first pair of podosomal setae very close to second, considerable distance between second and third pairs, but third, fourth, and fifth pairs close together; proximal anterodorsal seta of femur I small to minute; from *Micronycteris* spp. .... *P. micronycteridis* Furman, 1966 (p. 21)

First sternal setae longer, extending distinctly beyond first pair of pores; distance between first and second pairs of podosomal setae almost as great as distance between second and third pairs; proximal anterodorsal setae of femur I larger 8

8(7). First two pairs of dorsal podosomal setae distinctly shorter than others (third, fourth, and fifth); from *Tonatia silvicola* .... *P. tonatii* n. sp. (p. 24)

All dorsal podosomal setae subequal in length; from *Lonchorhina* spp. .... *P. gameroi* Machado-Allison and Antequera, 1971 (p. 22)

9(5). Ventral setae of legs I and II mostly normal, setaceous, and slender (however, some may be enlarged and spinelike); proximal anterodorsal seta of femur I, patella I, tibia I, and patella IV medium to large in size 10

Some ventral setae of legs I and II distinctly enlarged, blunt, and fusiform; proximal anterodorsal seta of femur I, patella I, tibia I, and patella IV always small 11

10(9). First pair of sternal setae long, extending almost to level of second pair of setae; second through fourth pairs of sternal setae extending beyond bases of adjacent posterior setae; large dorsal setae of tarsi III and IV coarsely barbed; from *Phyllostomus* spp. .... *P. acutisternus* Machado-Allison, 1964 (p. 29)

First pair of sternal setae of medium length, extending slightly beyond first pair of pores; second through fourth pairs of sternal setae of medium length, not extending to bases of adjacent posterior setae; large dorsal setae of tarsus III and IV finely barbed; from *Trachops cirrhosus* .... *P. paracutisternus* Machado-Allison and Antequera, 1971 (p. 28)

11(9). Some setae of ventral intercoxa IV area enlarged and expanded basally; many ventral setae of legs I and II blunt and fusiform; first pair of sternal setae longer, extending well beyond first pair of pores; second through fourth sternal setae longer, extending beyond bases of adjacent posterior setae; from *Phyllostomus* spp. .... *P. torrealbai* Machado-Allison, 1965a (p. 35)

Setae of ventral intercoxa IV area distinctly slender, never expanded basally; only anterior ventral seta of femur I blunt and fusiform; first pair of sternal setae short, extending only to level of first pair of pores; second through fourth sternal setae shorter, not extending to bases of adjacent posterior setae; from *Phylloderma stenops* .... *P. paratorrealbai* n. sp. (p. 37)

12(4). Sternal setae short, with first pair not extending to first pair of pores; proximal seta of coxa I small to minute, usually much smaller than distal seta; proximal antero- and posterodorsal setae of femur II both minute 13

Sternal setae longer, with first pair extending at least to or beyond first pair of pores; proximal and distal setae of coxa I longer and subequal in length; proximal posterodorsal seta of femur II never minute, but anterodorsal seta may or may not be minute 15

13(12). Distance between first and second pairs of dorsal podosomal setae greater than distance between second and third pairs; intercoxa IV area with nine pairs of setae; proximal anterodorsal seta of femur I, patella I, tibia I, and both proximal antero- and posterodorsal setae of femur IV large; from *Anoura geoffroyi* .... *P. vargasi* Hoffmann, 1944 (p. 52)

Distance between first and second pairs of dorsal podosomal setae less than distance between second and third pairs; intercoxa IV area with seven or eight pairs of setae; proximal anterodorsal seta of femur I, patella I, tibia I, and both proximal antero- and posterodorsal setae of femur IV small to minute 14

14(13). Sternal setae slender and longer, first pair extending posteriorly to or slightly beyond level of first pair of pores; intercoxa IV area posterior to holoventral plate with eight pairs of small, slender setae; posterolateral seta of coxa II long, length equal to width of coxa II; primarily from *Anoura caudifer* .... *P. paravargasi* n. sp. (p. 48)

Sternal setae small, first pair not extending posteriorly to level of first pair of pores; intercoxa IV area posterior to holoventral plate with seven or eight pairs of small more robust setae; posterolateral seta of coxa II much shorter than width of coxa II 15

15(14). Intercoxa IV area posterior to holoventral plate with seven pairs of setae; from *Leptonycteris curasoae* .... *P. paracaligus* n. sp. (p. 43)

Intercoxa IV area posterior to holoventral plate with eight pairs of setae; from *Glossophaga* spp. .... *P. caligus* Kolenati, 1857 (p. 41)

16(12). Smaller species (idiosomal length less than 450 μ); ventral setae (sternal and intercoxal) noticeably slender; sternal setae short, not extending to or near bases of adjacent posterior setae, and first pair extending no further than level of first pair of pores; intercoxa IV area with seven pairs of setae; from *Lionycteris spurrelli* .... *P. hopkinsi* Machado-Allison, 1965a (p. 54)

Larger species (idiosomal length greater than 500 μ); ventral setae more robust; sternal setae longer, extending to or beyond bases of adjacent posterior setae, and first pair extending beyond first pair of pores; number of setae on intercoxa IV area variable 7

17(16). First pair of setae posterior to sternal plate long and slender, distinctly more than half as long as posterior setae of sternal plate; intercoxa IV area with 9 to 10 pairs of setae; from *Desmodus rotundus* ... *P. herrerai* Machado-Allison, 1965a (p. 55)

First pair of setae posterior to sternal plate short to minute; intercoxa IV area with seven or eight pairs of setae 18

18(17). Distance between first and second pairs of dorsal podosomal setae no more than half the distance between second and third pairs; spermatophore process short, shaped as shepherd's crook; proximal anterodorsal seta of femur I minute, much smaller than posterodorsal seta; from *Sturnira* spp. .... *P. ojastii* Machado-Allison, 1964 (p. 56)

Distance between first and second pairs of dorsal podosomal setae almost as great as distance between second and third pairs; spermatophore process long, extensively recurved; proximal antero- and posterodorsal setae of femur I subequal and medium in length 19

19(18). Sternal setae shorter, first pair extending beyond first pair of pores but not near level of second pair of setae; intercoxa IV area with seven pairs of setae; proximal posterodorsal seta of femur IV small, much smaller than anterodorsal seta; from *Rhinophylla pumilio* .... *P. ramirezi* Machado-Allison and Antequera, 1971 (p. 57)

Sternal setae longer, first pair extending to or beyond level of second pair of setae; intercoxa IV area with eight pairs of setae; proximal antero- and posterodorsal setae long, subequal in length, from numerous phyllostomid bats, particularly *Artibeus* spp., *Uroderma* spp., and *Vampyrops* spp. .... P. *iheringi* Oudemans, 1902 (p. 58)

Group I

The 10 species comprising this first group of mites of the genus *Periglischrus* (see proposed classification on page 2 are primarily parasitic on bats of the subfamily Phyllostominae (family Phyllostomidae). The inclusion of these species of *Periglischrus* in Group I is based principally on their host-parasite association. The overall phenetic similarity among these 10 species is closely correlated with the host-parasite relationships. However, there are no specific morphological characters shared by all of them which can be used to distinguish the mites as a group. Such distinguishing characters are more evident and useful on the subgroup level.

Subgroup A

This subgroup is composed of three species, *P. parvus*, *P. micronycteridis*, and *P. gameroi*. These species are similar in size and in the general form of the female sternal plates (Fig. 1-3). They differ from the five species of subgroup B in the form of the anterior end of the sternal plates (i.e., no distinct anterior projection or constriction anterior to first sternal setae) and in the reduction of the mediodistal lobe on the palpal tibia. Also, they differ from the two species of subgroup C in having all normal, setaceous setae posterior to the sternal plate and ventrally on the legs. The three species of this subgroup are parasitic primarily on two closely related bat genera, *Micronycteris* and *Lonchorhina*.

Periglischrus parvus Machado-Allison, 1964
Fig. 1, 21-22

Periglischrus parvus Machado-Allison, 1964: 195-197.

Description

Female: Idiosomal length, 854 μ; greatest width 575 μ. Ventral idiosomal setae slender, small to minute (length 6-13 μ). Sternal plate generally oval in shape (median length, 113 μ; greatest width, 89 μ); posterior end and lateral sides broadly rounded; anterior projection broad and angularly pointed (Fig. 1). Dorsal plate oblong-oval (median length, 344 μ; greatest width, 245 μ); posterior quarter superficially divided from anterior portion; plate only slightly ornamented with several medium-sized dark areas and a number of small pores or setal bases. Six pairs of medium-sized (length 19-26 μ) dor-

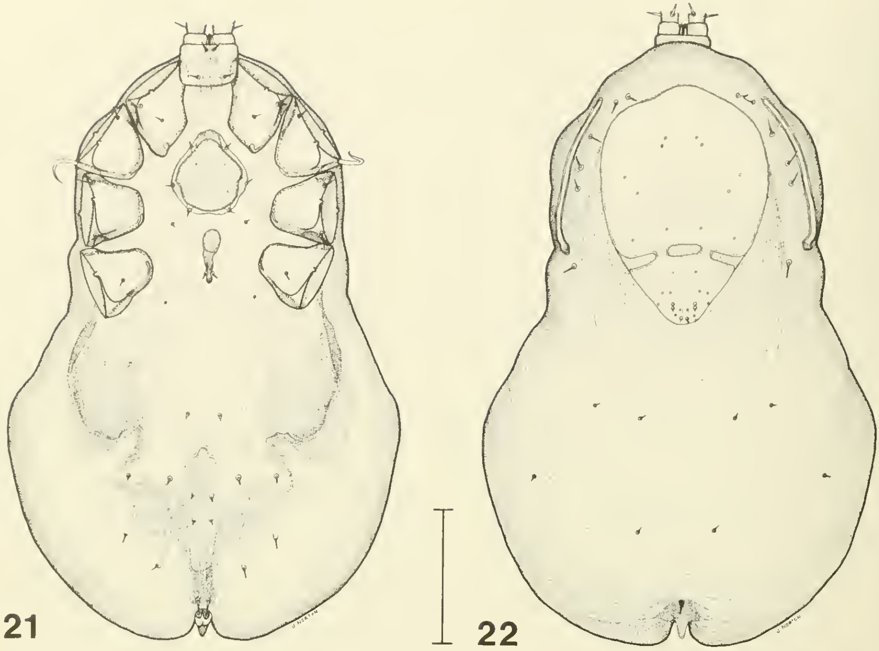

Fig. 21-22. *Periglischrus parvus* Machado-Allison, female. (21) venter; (22) dorsum, scale = 200 μ.

sal podosomal setae located lateral to dorsal plate; first and second pairs close together anterior to peritremes; middle three pairs located laterally between dorsal plate and peritremes with second and third pairs close together; sixth pair adjacent to stigmata. Dorsal opisthosoma with four or five pairs of minute setae. Dorsal leg setae generally large to medium sized, except proximal anterodorsal seta of femur I, femur II, patella II, and proximal posterodorsal seta of femur III and femur IV minute to rather small. Posterolateral setae of legs I-II, IV and anterolateral setae of legs III-IV rather large, recurved. Most ventral leg setae small to minute; one distal posteroventral seta on each tibia I-II and tarsus I-II superficially short, blunt; distal posteroventral seta of each femur I-II, patella I-II, and distal anteroventral seta of each femur III-IV, patella III-IV and tibiae III-IV somewhat enlarged and spinelike.

Male: No specimens available for examination.

Female Deutonymph: Unknown

Male Deutonymph: Unknown

Venezuelan Records (18 females): Only 7 collections were made, all from *Micronycteris nicefori*, in Bolívar (4), T.F. Amazonas (12), and Miranda (1), during January, April, July, and September.

Remarks: *P. parvus* most closely resembles *P. gameroi* and *P. micronycteridis;* all three species comprising subgroup A, group I. Phenetically, these three species are similar in the following major characters: size and shape of female sternal plate (Fig. 1-3); dorsal podosomal setae small to medium in length; proximal posterodorsal seta of femur IV minute; and general size of idiosoma smaller than other species. Both male and female of *P. parvus* are distinctly smaller than those of *P. gameroi;* and in the female of *P. parvus* the anterior projection of the sternal plate is broader and more angularly pointed. *P. parvus* differs from *P. micronycteridis* in the shape of the female sternal plate; the general size of the idiosoma is smaller in the female and male of the former; and the proximal anterodorsal seta of each femur I, patella I, and tibia I is medium in length rather than minute.

The close phenetic relationship between *P. parvus* and *P. micronycteridis* is correlated well with host-parasite relationships. *P. parvus* has been recorded only from Venezuela on bats of the genus *Micronycteris*, (*M. hirsuta* and *M. nicefori*); *P. micronycteridis* is also known only from *Micronycteris*. However, the host species are *M. megalotis* and *M. minuta*. *P. gameroi* has been reported from species of *Lonchorhina* (a genus which is closely related to *Micronycteris*).

Periglischrus micronycteridis Furman, 1966
Fig. 2

Periglischrus micronycteridis Furman, 1966: 147-149.

DESCRIPTION

FEMALE: Idiosomal length, 1077 μ; greatest width, 945 μ. Ventral idiosomal setae slender, small to minute (length 8-17 μ). Sternal plate somewhat pear shaped (median length, 128 μ; greatest width, 82 μ); sclerotization of margins rather irregular and anterior projection truncate (Fig. 2). Dorsal plate oblong oval (median length, 364 μ; greatest width, 252 μ); posterior quarter superficially divided from anterior portion by narrow band of lightly sclerotized integument; plate ornamented with large to medium-sized circular dark areas and small pores or setal bases. Six pairs of medium-sized (length 19-21 μ) podosomal setae located lateral to dorsal plate; first and second pairs close together anterior to peritremes; sixth pair located adjacent to stigmata. Dorsal opisthosoma with four or five pairs of small to minute setae. Dorsal leg setae generally large to medium sized, except proximal anterodorsal seta of each femur I-III, patella I-II, tibia I-II, and proximal posterodorsal seta of femur III-IV minute. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV rather large, recurved. Most ventral leg setae small to minute, except distal posteroventral seta of each tibia I-II and tarsus I-II superficially blunt, and distal posteroventral seta of each femora I-II, patella I-II, and distal anteroventral seta of each femur III-IV, patella III-IV, and tibia III-IV somewhat enlarged and spinelike.

MALE: Median length of idiosoma, 386 μ; greatest width, 316 μ. Holoventral plate somewhat pear shaped (median length, 183 μ; greatest width, 129 μ); greatest width at level of second sternal setae; five pairs of setae on holoventral plate rather slender, small to medium in length (15-39 μ); first sternal setae extend posteriorly to level of first pair of pores. Intercoxa IV area with seven pairs of setae plus pair of subterminal adanal setae; first pair minute (length less than 12 μ); all others small (length 20-25 μ). Dorsal plate oblong-oval (median length, 346 μ; greatest width, 243 μ), with posterior end narrower; posterior quarter superficially divided from anterior portion by narrow transverse strip of lightly sclerotized integument. Six pairs of medium-sized (length 20-28 μ) podosomal setae lateral to dorsal plate; first two pairs close together anterior to peritremes; middle three pairs close together laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Coxal setae medium sized, except posterolateral seta of coxa II somewhat larger. Most ventral leg setae small to medium sized, some robust and spinelike. Posterolateral setae of legs I-II and anterolateral setae of legs II and IV medium in length and recurved; other antero- and posterolateral leg setae smaller. Distal dorsal setae of trochanters II-IV, femora I-IV, and patella I-IV distinctly longer than all other dorsal leg setae; proximal anterodorsal seta of each femur I-III and posterodorsal seta of femur III-IV minute.

VENEZUELAN RECORDS (38 females, 4 males, and 1 protonymph): *P. micronycteridis* is almost totally restricted to bats of the genus *Micronycteris*. There were nine collections from *M. megalotis*, three from *M. minuta*, and one from *M. microtis* (an exceptional collection came from *Carollia* sp.). Collections were from T. F. Amazonas (3), Barinas (3), Zulia (2), Apure (1), Bolívar (1), Falcón (1), Lara (1), Miranda (1), and Trujillo (1). Collections were made during every month except February, April, May, and August.

REMARKS: As noted in the treatment of *P. parvus*, *P. micronycteridis* most closely resembles that species. This phenetic resemblance is well correlated with host-parasite relationships. Both species are known from bats of the genus *Micronycteris*, although the host species differ. The Venezuelan specimens of *P. micronycteridis* closely resemble those reported from the same host in Panamá by Furman (1966).

Periglischrus gameroi Machado-Allison and Antequera, 1971
Fig. 3

Periglischrus gameroi Machado-Allison and Antequera 1971: 6-9.

DESCRIPTION

FEMALE: Idiosomal length, 1019 μ; greatest width, 968 μ. Ventral idiosomal setae small to minute (length 8-19 μ). Sternal plate generally pear shaped (median length, 130 μ; greatest width, 102 μ); posterior margin truncate, however it may appear invaginated; lateral margins irregularly rounded; anterior projection rather broad with narrowly rounded apex (Fig. 3). Dorsal plate oblong-oval (median length, 323 μ; greatest width, 243 μ), with posterior end narrowing more sharply than anterior end; posterior quarter faintly appears divided from anterior portion by narrow suture laterally and medially; plate ornamented with large circular darker areas and small pores or setal bases. Six pairs of medium sized (length 23-34 μ) podosomal setae located lateral to dorsal plate; first and second pairs located anterior to peritremes; middle three pairs laterally between dorsal plate and peritremes; distance between first five setae subequal; sixth pair located just posterior to stigmata. Dorsal opisthosoma with five pairs of minute setae. Dorsal leg setae generally large to medium sized, except proximal anterodorsal seta of each femur II, patella II, anterodorsal seta of femur III and femur IV small to minute. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV rather large and recurved. Most ventral leg setae small to minute, except one distal posteroventral seta of each tibia I-II and tarsus I-II superficially short, blunt; distal posteroventral seta of each femur I-II, patella I-II, distal anteroventral seta of femur III-IV, patella III-IV, and tibia III-IV somewhat enlarged and spinelike.

Male: Median length of idiosoma 400 μ; greatest width, 310 μ. Holoventral plate broadly spade shaped (median length, 180 μ; greatest width, 166 μ); greatest width at level just anterior to second sternal setae; five pairs of setae on holoventral plate medium sized (length 35-49 μ); first sternal setae extend posteriorly slightly beyond level of first pair of pores. Intercoxa IV area with seven pairs of setae plus pair of subterminal adanal setae; first pair minute (length less than 8 μ); all others rather robust, small to medium sized (length 20-26 μ). Dorsal plate oval (median length, 367 μ; greatest width, 257 μ); posterior quarter superficially divided from anterior portion by narrow, transverse strip of lightly sclerotized integument. Six pairs of medium sized (length 28-40 μ) podosomal setae lateral to dorsal plate; first two pairs located just anterior to peritremes; middle three pairs laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Coxal setae medium length, with posterolateral seta of coxa II largest and anterolateral seta of coxa III smallest. Most ventral leg setae small to medium sized, some rather robust and spinelike. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV medium in length and recurved; other antero- and posterolateral leg setae smaller. Certain distal dorsal setae of leg segments rather large and long; however, most dorsal leg setae small to medium sized, except proximal anterodorsal seta of femur II and proximal posterodorsal seta of each femur III-IV minute.

Venezuelan Records (47 females, 13 males, 2 deutonymphs, and 4 protonymphs): Of the 38 collections of *P. gameroi*, 34 were from bats of the genus *Lonchorhina*: *L. aurtta* (21) and *L. orinocensis* (13). The other 4 collections included 1 each from *Pteronotus parnellii, Artibeus jamaicensis, Eptesicus furinalis,* and *Desmodus rotundus.* Machado-Allison and Antequera (1971) reported 7 collections (14 females, 2 males) from *L. aurita* and 7 (9 females, 1 male, and 1 protonymph) from *Lonchorhina* sp. nov. (=*L. orinocensis*), from the Smithsonian Venezuelan Project, all included in the total figures presented here. Collections were made in the following states and districts: Carabobo (11), Apure (8), Trujillo (7), T. F. Amazonas (5), Zulia (2), Dto. Federal (2), Miranda (2), and Sucre (1). Collections were made during the months of January (7), April (2), June (1), July (1), August (3), September (5), October (4), November (10), and December (5).

Remarks: As noted previously, *P. gameroi* resembles *P. parvus* and *P. micronycteridis.* However, it differs in the following characters: distinctly larger than *P. parvus*, shape of female sternal plate rather distinctive (see Fig. 3), and proximal anterodorsal seta of each femur I, patella I, and tibia I of moderate size rather than minute as in *P. micronycteridis. P. gameroi* has been reported from two species of the genus *Lonchorhina* in Venezuela. The *Lonchorhina* sp. nov. reported by Machado-Allison and Antiquera (1971) was subsequently determined to be *L. orinocensis.* Bats of the genera *Lonchorhina* and *Micronycteris* are closely related.

Subgroup B

This subgroup is composed of five species: *P. tonatii* n. sp., *P. paracutisternus, P. acustisternus, P. dusbabeki,* and *P. grandisoma* n. sp. These species are arranged in order of increasing size and consecutive similarity of female sternal plates (Figs. 4-8). The species of this subgroup differ from those of subgroups A and C in the form of the anterior end of the sternal plate (i.e., with distinct median anterior projection, subtriangular in shape, and with distinct constriction anterior to first sternal setae) and in the presence of a medium-sized to prominent mediodistal lobe on the palpal tibia. The separation of the two species of subgroup C, *P. torrealbai* and *P. paratorrealbai* n. sp., from this subgroup is based only on morphological characters rather than host-parasite associations. As noted previously, *P. torrealbai* is found in association with *P. acutisternus* on bats of the genus *Phyllostomus,* and *P. paratorrealbai* n. sp. is found in association with *P. grandisoma* n. sp. on *Phylloderma stenops.* The five species of this subgroup are parasitic primarily on several closely related genera: *Tonatia, Trachops, Phyllostomus, Mimon,* and *Phylloderma.*

Periglischrus tonatii n. sp.
Fig. 4, 23-31

Description

Female (Holotype): (Fig. 4, 23-25). *Venter*: Sternal plate somewhat diamond shaped; posterior margin slightly rounded to slightly invaginated; anterior end narrowly rounded with small quarter-moon-shaped platelet just anterior to sternal plate margin (Fig. 4). First 3 pairs of sternal setae on margin of plate, with fourth pair (metasternal) posterior to sternal plate. Two pairs of small pores present on sternal plate. Genital plate oblong, both ends rounded and bearing 1 pair of small setae near posterior end. Ventral opisthosoma with 10 pairs of minute to moderately long, slender setae (smallest setae near genital plate and longest near posterior of ventral idiosoma). Pair of medium length adanal setae present im-

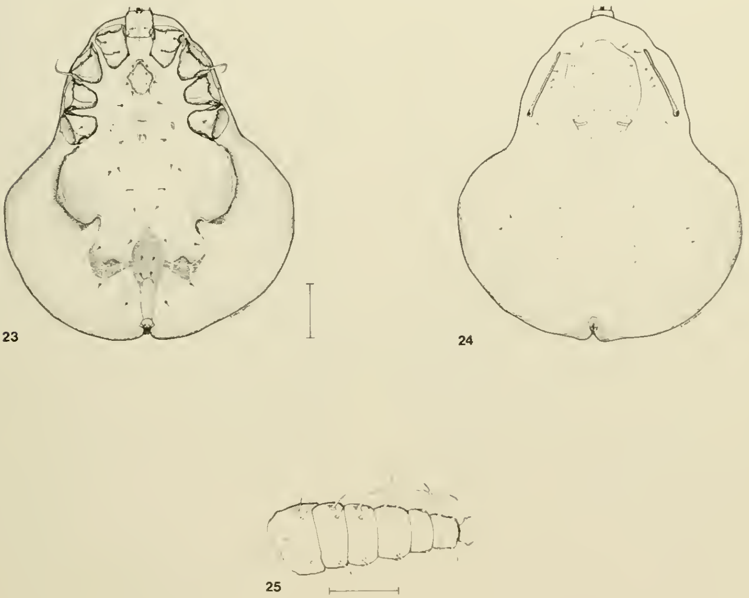

Fig. 23-25. *Periglischrus tonatii* n. sp., female. (23) venter; (24) dorsum, scale = 200 μ; (25) ventral view of leg IV, scale = 100 μ.

mediately ventral to anal orifice; anal orifice located dorsally and terminally. Ventral opisthosoma with curiously shaped, heavily sclerotized bilateral areas. *Dorsum*: Peritreme dorsal, lying over coxae II and III; of normal length and width for genus. Dorsal plate oblong-oval in general shape; broader anteriorly with prominent shoulders, and narrower posteriorly; posterior quarter superficially appearing divided by narrow transverse band of lightly sclerotized integument; plate ornamented with darker areas of various shapes and sizes and small pores or setal bases. Dorsal podosoma with 6 pairs of medium-sized setae lateral to dorsal plate; first 2 pairs anterior to peritremes; third, fourth, and fifth pairs form linear group between dorsal plate and peritremes; sixth pair posterior to stigmata. Dorsal opisthosoma bears 5 pairs of minute setae in vertical rows of 3 medial pairs and 2 more lateral pairs. *Legs*: Each coxa with elongate ridge, usually posteroventral longitudinal or diagonal; coxa I with 2 small setae, proximal and distal in location; coxa II with 1 small anterolateral seta and 1 rather large posteromarginal seta; coxa III with 1 small inapparent anterolateral seta and 1 medium-sized posterolateral seta; coxa IV with 1 minute medial seta. Proximal posteroventral seta of each tibia I-II, patella II, and 1 medial ventral seta of each tarsus I-II short, blunt, peglike; some posteroventral setae of trochanter II, femora I-II, patella I, and some anteroventral setae of femora III-IV and tibiae III-IV medium in length, enlarged, and spinelike; all other ventral leg setae small to minute. Some posterolateral setae of legs I-II and some anterolateral setae of legs III-IV large, recurved; all other antero- and posterolateral setae of legs small, straight and setaceous. Proximal anterodorsal seta of each femur I-IV, patella I-III, tibia I-III, proximal posterodorsal seta of femur II-IV, patella I-III, tibia I-III, and some dorsal setae of tarsi I-IV rather small to minute; all other dorsal setae medium to large in size. *Gnathosoma*: gnathosomal and median hypostomal setae small; lateral and distal hypostomal setae inapparent. Mediodistal lobe of palpal tibia medium sized. Two pairs of blunt, peglike setae on laterodistal margin of palpal tibia. Other gnathosomal features normal for genus. *Measurements*: Idiosoma length, 1120 μ; greatest width 983 μ. Sternal plate length, 139 μ; greatest width, 113 μ. Sternal setae length, 15-23 μ; ventral opisthosomal setae length, 8-28 μ. Peritreme length 250 μ. Dorsal plate length, 408 μ; greatest width, 275 μ. Podosomal setae length, 13-27 μ. Dorsal opisthosomal setae length, 6-10 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 314 μ; leg II, 267 μ; leg III, 253 μ; leg IV, 257 μ.

Male: (Allotype). (Fig. 26-27). *Venter*: Holoventral plate covers almost entire venter between coxae I-III; anterior end abruptly narrows between coxae I. Five pairs of moderately large setae present on holoventral plate; first pair extending to or almost to level of second setal bases; two pairs of circular pores present medially between setae; anterior end of plate bears hat-shaped sclerities. Intercoxa IV area bears eight pairs of small to medium-sized, adanal setae included; first pair small, less than half length of genital setae; anal orifice located terminally just posterior to adanal setae, with single minute postanal seta located dorsoterminally. *Dorsum*: peritreme dorsal, lying over coxae II and III; of normal length and width for genus. Dorsal plate oval with posterior end narrower; posterior quarter superficially appears divided by narrow transverse band of lightly sclerotized integument; plate slightly ornamented with lighter and darker areas, especially single narrow, elongate median lightly sclerotized area, and some small pores or setal bases. Dorsal podosoma bears six pairs of medium-sized setae lateral to dorsal plate; first two pairs anterior to peritremes; next three pairs located laterally between dorsal plate and peritremes; sixth pair located posterior to stigmata. *Legs*: Each coxa bears elongate, longitudinal or diagonal ventral ridge; coxa I with two moderately large setae, proximal and distal in position; coxa II with one medium-sized anteromarginal seta and one rather long posteromarginal seta; coxa III with one small anteromarginal seta and one rather large posteromarginal seta; coxa IV with one medium-sized ventral seta. Ventral leg setae small to medium sized, some enlarged and spinelike. Some posterolateral setae of legs I-IV and some anterolateral setae of legs III-IV large, recurved; other antero- and posterolateral setae smaller, setaceous. Proximal anterodorsal seta of femur II and posterodorsal seta of each femur III-IV minute; distal dorsal setae of femora I-IV, patella I-IV, and proximal dorsal setae of tarsi III-IV large, long; other dorsal leg setae of medium length. *Gnathosoma*: Gnathosomal and median hypostomal setae small; lateral and distal hypostomal setae inapparent or absent. No mediodistal lobe present on palpal tibia; two pairs of blunt peglike setae on laterodistal margin of palpal tibia, some other palpal setae spinelike. *Measurements*: Idiosoma length, 393 μ; greatest width 261 μ. Holoventral plate length, 196 μ; greatest width,

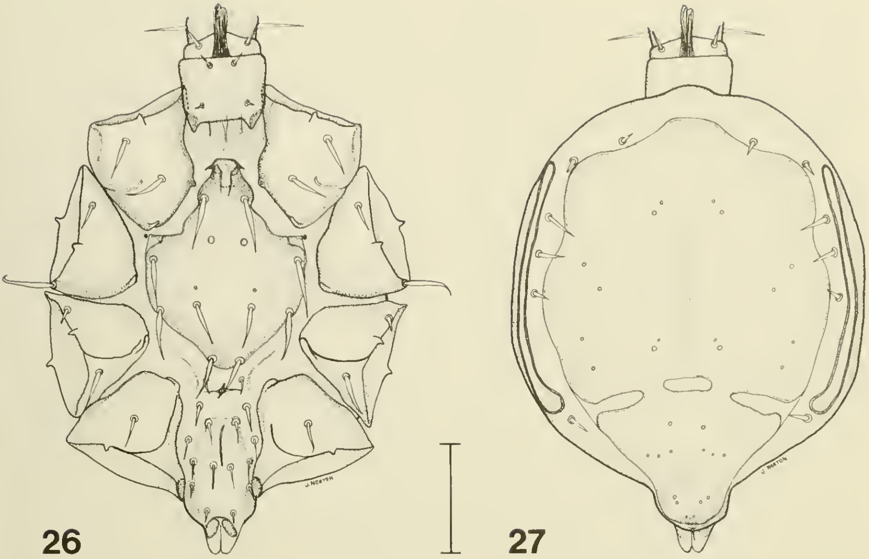

Fig. 26-27. *Periglischrus tonatii* n. sp., male. (26) venter; (27) dorsum, scale = 100 μ.

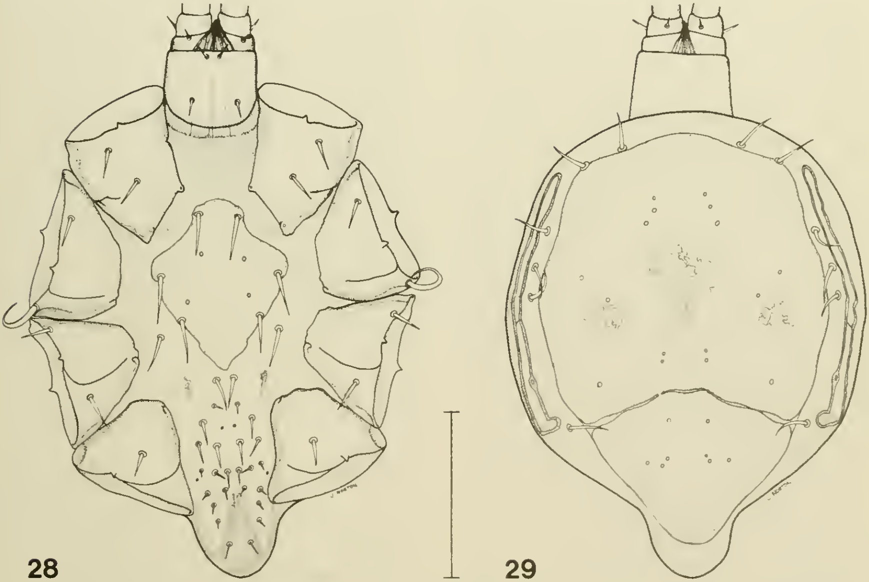

Fig. 28-29 *Periglischrus tonatii* n. sp., female deutonymph. (28) venter; (29) dorsum, scale = 200 μ.

144 μ; sternal and genital setae length, 37-54 μ; ventral intercoxa IV area setae length, 11-34 μ. Peritreme length, 222 μ. Dorsal plate length, 387 μ, greatest width, 254 μ. Podosomal setae length, 17-20 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 315 μ; leg II, 266 μ; leg III, 263 μ; leg IV, 298 μ.

Female Deutonymph: (Fig. 28-29). *Venter*: Sternal plate spade shaped; with 3 pairs of moderately large sternal setae and 2 pairs of circular pores; metasternal setae (1 pair) flank third pair sternal setae; genital setae located just posterior to plate. Intercoxa IV area with 12 pairs of small to medium-sized setae (1 pair adanal setae included), first pair behind genital setae smallest. *Dorsum*: Peritreme dorsal, of normal length and width; lying over coxae II and III. Dorsal plate oval, with posterior end narrower; posterior quarter divided from anterior portion by distinct suture. Dorsal podosoma bears 6 pairs of moderately large setae lateral to dorsal plate; first 2 pairs anterior to peritreme on margin of plate; next 3 pairs close together located between lateral margin of plate and peritremes; sixth pair posterior to stigmata. *Legs*: Each coxa I-III with 2 medium-sized to large setae, and coxa IV with 1 seta; each coxa with slightly developed posteroventral longitudinal or diagonal ridge. Ventral leg setae small to medium sized, some spinelike. Some posterolateral setae of legs I-IV and anterolateral setae of legs III-IV rather large. Distal dorsal setae of femora I-IV, patella I-IV, and proximal dorsal setae of tarsi III-IV rather long; proximal anterodorsal seta of femur II and femur III, and proximal posterodorsal seta of femur III and femur IV minute; other dorsal leg setae small to medium in length. *Gnathosoma*: Gnathosomal and median hypostomal setae small; lateral and distal hypostomal setae absent or inapparent. No mediodistal lobe present on palpal tibia. Palpal setae small to medium in length, some spinelike; 2 pair laterodistal seta of palpal tibia peglike. *Measurements*: Idiosoma length, 535 μ; greatest width, 403 μ. Sternal plate length, 186 μ; greatest width, 147 μ. Sternal setae length, 41-55 μ; genital setae length, 36 μ; intercoxa IV area setae length, 11-32 μ. Peritreme length, 284 μ. Dorsal plate length, 531 μ; greatest width, 323 μ. Podosomal setae length, 37-45 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 360 μ; leg II, 337 μ; leg III, 313 μ; leg IV, 340 μ.

Male Deutonymph: Unknown

Protonymph: (Fig. 30-31). *Venter*: Sternal plate spade shaped; bearing three pairs of moderately large sternal setae. Intercoxa IV area with four pairs of small setae plus one pair of adanal setae. *Dorsum*: Peritreme dorsal, short, lying over coxa III. Dorsal plate generally oblong-oval; posterior quarter partially divided from anterior portion by lateral incisions. Dorsal podosoma with five pairs of small setae lateral to dorsal plate; two pairs anterolaterally at level of coxae I; two pairs laterally at level of coxae II; one pair posterior to stigmata. *Legs*: Each coxa I-III with two medium-sized setae; coxa IV with one small seta. Ventral leg setae mostly small, many spinelike. Some posterolateral setae of legs I-III and anterolateral setae of legs III medium in length; most antero- and posterolateral setae of leg IV rather large. Distal dorsal setae of femora I-IV, patella I-IV, and proximal setae of tarsi III-IV, rather long; all other ventral setae small to minute. *Gnathosoma*: Gnathosomal and medial hypostomal setae small; lateral and distal hypostomal setae absent or inapparent. No mediodistal lobe on palpal tibia; palpal setae small, some spinelike; two pairs laterodistal setae of palpal tibia peglike. *Measurements*: Idiosoma length, 391 μ, greatest width, 299 μ. Sternal plate length, 164 μ; greatest width, 110 μ. Sternal setae length, 10-41 μ; intercoxa IV setae length, 14-19 μ. Peritreme length, 113 μ. Dorsal plate length, 374 μ; greatest width, 278 μ. Podosomal setae length, 14-26 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 227 μ; leg II, 222 μ; leg III, 219 μ; leg IV, 215 μ.

Type Material: Holotype female and 20 paratype females, (SVP-30751) from *Tonatia silvicola*, 25 km S Pto. Ayacucho (114 m), T. F. Amazonas, Venezuela, 19 September 1967; allotype male, 1 paratype male, 2 paratype females, 1 paratype deutonymph, and 1 paratype protonymph (SVP-28813) from *Tonatia carrikeri* San Juan, Rio Manapiare (155 m), 163 km ESE Pto. Ayacucho, T. F. Amazonas, Venezuela, 24 July, 1967; 1 paratype male (SVP-29911) from *Tonatia brasiliensis*, same locality as SVP-28813, 28 July 1967; 1 paratype deutonymph (SVP-30067) from *Tonatia bidens*, and 1 paratype female (SVP-30068) from *Tonatia brasiliensis*, with same collection data as SVP-29911.

Venezuelan Records (46 females, 5 males, 2 deutonymphs, and 1 protonymph): This spinturnicid mite is almost totally restricted to bats of the genus *Tonatia*. The single exception in the Venezuelan records was a female from *Desmotus rotundus*. There were 5 collections from *Tonatia silvicola*, 2 each from *Tonatia brasiliensis* and *Tonatia carrikeri* and 1 from

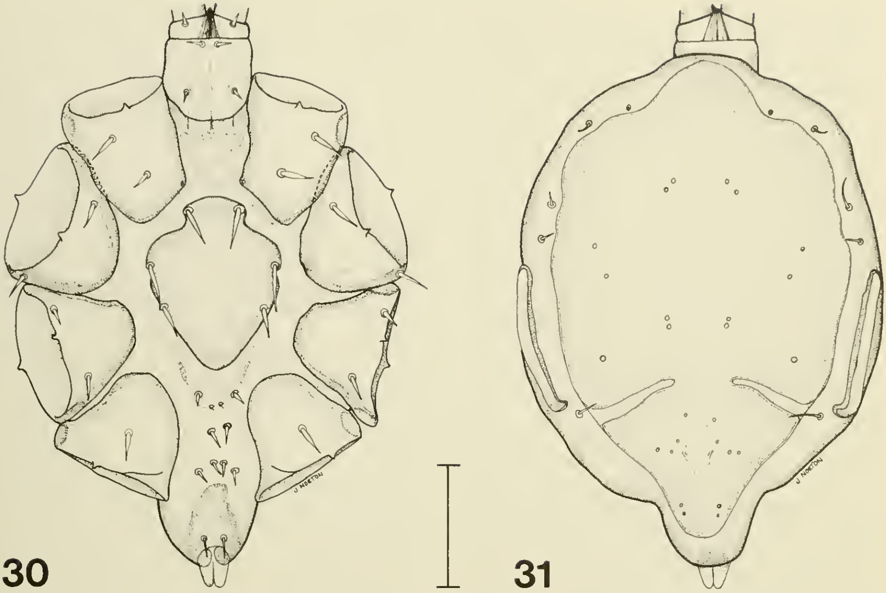

Fig. 30-31. *Periglischrus tonatii* n. sp., protonymph. (30) venter; (31) dorsum, scale = 100 μ.

Tonatia bidens. Collections were made in T. F. Amazonas (10) and Trujillo (1), during the months of April, June, July, and September.

Remarks: In the proposed classification, this new species is the first of five species comprising subgroup B, group I of the genus. This group differs from other species of the genus in having a heavily sclerotized subtriangular median anterior projection of the sternal plate (with a distinct construction anterior to the first sternal setae) and in having the mediodistal lobe of the palpal tibia rather prominent and medium sized. *P. tonatii* most closely resembles *P. paracutisternus* in overall size and in the general shape of the female sternal plate; both species are distinctly smaller mites than the other three species of the group, *P. acutisternus*, *P. dusbabeki*, and *P. grandisoma* n. sp. *P. tonatii* differs from other closely related species in the following characters: posteroventral setae of femur IV, patella IV, and tibia IV of females small, straight, and setaceous rather than large and recurved; female sternal plate with short broadly rounded anterior projection, without lateral angular extensions; and first two pairs of dorsal podosomal setae of males distinctly shorter than other three pairs. *P. tonatii* is recorded typically from bats of the genus *Tonatia*.

Periglischrus paracutisternus
Machado-Allison and Antequera, 1971
Fig. 5

Periglischrus paracutisternus Machado-Allison and Antequera, 1971: 12-15.

Description:

Female: Idiosomal length, 1004 μ; greatest width, 927 μ. Ventral idiosomal setae mostly small to medium sized (length 8-20 μ); however, several pairs just behind genital plate reduced and minute. Sternal plate oval in general shape (median length, 139 μ; greatest width, 104 μ) with double hat-shaped anterior projection (Fig. 5); anterior projection moderately broad with two pairs of short lateral extensions anterior to first sternal setae. Dorsal plate oblong-oval (median length, 403 μ; greatest width, 309 μ); posterior quarter superficially divided from anterior portion by narrow transverse suture; plate ornamented with darker areas of irregular shape and variable size. Six pairs of medium-sized (length 17-27 μ) podosomal setae located lateral to dorsal plate in three groups of two, three, and one.

Dorsal opisthosoma with four or five pairs of minute setae. Dorsal leg setae large to medium sized, except proximal anterodorsal seta of each femur I-IV, patella II-III, and proximal posterodorsal seta of each femur III-IV rather small to minute. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV mostly large, recurved. Distal posterolateral seta of each patella II, tibia I-II, and tarsi I-II superficially appears short and blunt. Distal posterolateral seta of each femur I-II, patella I, and trochanter II enlarged, flattened with posterior margin serrated. Distal anterolateral seta of each femur III-IV, patella III-IV, and tibia III-IV and distal posterolateral seta of each femur III, patella III, and tibia III enlarged, spinelike. All other ventral leg setae slender, small or minute.

Male: Median length of idiosoma, 429 μ; greatest width, 359 μ. Holoventral plate generally spade shaped (median length, 188 μ; greatest width, 165 μ); place of greatest width at level of second sternal setae; five pairs of setae on holoventral plate slender, moderately long (44-56 μ); first sternal setae extend posteriorly just beyond level of first pair of pores. Intercoxa IV area with seven pairs of setae plus one pair of subterminal adanal setae; first pair slender, quite small (length 16 μ); others small to medium sized (length 22-37 μ). Dorsal plate broadly oval (median length, 377 μ; greatest width, 292 μ); posterior quarter superficially divided from anterior portion by narrow transverse band of lightly sclerotized integument. Six pairs of rather small podosomal setae located lateral to dorsal plate; first two pairs close together anterior to peritremes; middle three pairs close together laterally between dorsal plate and peritremes; sixth pair located posterior to stigmata. Coxal setae medium sized, except rather large, long posterolateral seta of coxa II and small spinelike anterolateral seta of coxa III. Ventral leg setae small to medium in length, many robust and spinelike. Most posterolateral setae of legs I-II, IV, and anterolateral seta of legs III-IV moderately large, some slightly recurved; other antero- and posterolateral setae of legs smaller. Most dorsal leg setae medium sized to large; many distal setae of leg segments very large; however, proximal anterodorsal seta of femur II and proximal posterodorsal seta of femur III and femur IV minute. Large dorsal setae of legs III-IV distinctly serrated.

Venezuelan Records (53 females, 44 males, 9 deutonymphs, and 9 protonymphs): 35 of the 37 collections were from *Trachops cirrhosus;* 1 was from *Rhogeessa tumida,* and 1 from *Anoura geoffroyi.* Machado-Allison and Antequera (1971) reported 9 of the above collections of *P. paracutisternus* (10 females, 16 males, and 2 deutonymphs) from *Trachops cirrhosus* (8) and 1 from *Anoura geoffroyi.* Collections were made in: T.F. Amazonas (18), Bolívar (6), Apure (5), Guárico (4), Zulia (1), Yaracuy (2) and 1 unknown. Collections were made during every month, except February and November, with most during April, May, July, and August.

Remarks: *P. paracutisternus* resembles *P. tonatii* in several characters: i.e., overall size, general shape of sternal plate, and size of proximal anterodorsal seta of each femur I, patella I, tibia I, femur IV, and proximal posterodorsal seta of femur IV (all small to minute). The male of this species is phenetically similar to *P. acutisternus* in having the large dorsal setae of tarsi III-IV rather coarsely barbed. However, it differs in having shorter ventral setae. This species is recorded primarily from *Trachops cirrhosus* in Venezuela. The one collection each from *Anoura geoffroyi* and *Rhogeessa tumida* are probably accidental or collection contaminants.

Periglischrus acutisternus Machado-Allison, 1964
Fig. 6

Periglischrus acutisternus Machado-Allison, 1964: 200-202.

Periglischrus tiptoni Furman, 1966: 144-147.

Description

Female: Idiosomal length, 1418 μ; greatest width, 1076 μ. Most ventral idiosomal setae small to medium sized (length 15-22 μ); first pair just posterior to genital plate slender and minute; second and third pairs rather small, basally expanded and spinelike; remaining seven pairs of ventral opisthosomal setae small to medium sized, with some slightly expanded basally. Sternal plate generally flask shaped (median length, 266 μ; greatest width, 146 μ); posterior margin almost truncate; lateral margins rounded; anterior end narrows forming rather narrow projection, arrow-shaped apex (constricted anterior to first sternal setae with rounded lateral extensions and narrowly rounded apex) (Fig. 6). Dorsal plate oblong-oval (median length, 549 μ; greatest width, 378 μ). Posterior quarter superficially divided from anterior portion by narrow transverse suture; plate ornamented with numerous irregularly round, dark areas of variable size and small pores or setal bases. Six pairs of medium sized (length 20-35 μ) podosomal setae located lateral to dorsal plate in groups of two, three, and one. Dorsal opisthosoma with four pairs of minute setae. Dorsal leg setae medium to large in size, except proximal anterodorsal seta of each femur II and femur III, and proximal posterodorsal seta of femur III rather small to minute. Posterolateral setae of legs I-III and anterolateral setae of legs III-IV large and recurved, most of which bear fine to coarse serrations. Distal posteroventral seta on each tibia I, tarsus I, patella II, tibia II, tarsus II, and distal anteroventral seta on each patella II, tibia II, and tibia III short, blunt, peglike. Distal posteroventral setae of femur I, patella I, trochanter II, femur II, and distal anteroventral setae of trochanters III-IV, femora III-IV, patella III-IV, and tibia IV medium sized, enlarged and serrated. Palpal tibia bear very prominent mediodistal lobes.

MALE: Median length of idiosoma, 599 μ; greatest width, 450 μ. Holoventral plate generally spade shaped (median length, 275 μ; greatest width, 217 μ), with greatest width at level of second sternal setae; five pairs of setae on holoventral plate rather large (length 64-80 μ), first pair extend posteriorly beyond first pair of pores to level of second sternal setae. Intercoxa IV area with seven pairs of setae plus one pair of subterminal adanal setae; first pair minute (length less than 15 μ); all others medium sized (length 30-46 μ). Dorsal plate oval (median length, 514 μ; greatest width, 353 μ); posterior quarter superficially divided from anterior portion by narrow transverse band of lightly sclerotized integument. Six pairs of medium-sized (length 28-37 μ) podosomal setae located lateral to dorsal plate; first two pairs located anterior to peritremes; middle three pairs located laterally between dorsal plate and peritremes; sixth pair set posterior to stigmata. Coxal setae medium to large in size; posterolateral seta of coxa II not distinctly larger than other coxal setae; however, anterolateral seta of coxa III smaller and spinelike. Ventral leg setae small to medium sized, many robust, spinelike. Antero- and posterolateral setae vary from small to moderately large. Most dorsal leg setae medium to large in size; distal dorsal setae of most leg segments larger with proximal setae smaller; proximal anterodorsal seta of femur II and proximal posterodorsal seta of femur III and femur IV minute; large dorsal setae of legs III-IV usually rather coarsely serrated.

VENEZUELAN RECORDS (184 females, 154 males, 68 deutonymphs, 87 protonymphs, and about 80 specimens in alcohol): of the 213 collections, 197 were from bats of the genus *Phyllostomus* (*P. hastatus*, 101; *P. discolor*, 76; *P. elongatus*, 20). There were 2 collections each from *Artibeus jamaicensis* and *Desmodus rotundus*, and 1 each from *Pteronotus parnellii*, *Pteronotus suapurensis*, *Carollia perspicillata*, *Carollia* sp., *Sturnira lilium*, *Uroderma magnirostrum*, *Vampyrops* sp., *Chiroderma villosum*, *Artibeus cinerus*, *Artibeus fuliginosus*, *Myotis albescans*, and *Molossops planirostris*. Collections were made in: T. F. Amazonas (83), Falcón (31), Sucre (22), Zulia (21), Monagas (18), Trujillo (7), Carabobo (7), Bolívar (7), Miranda (4), Guárico (4), Apure (3), Yaracuy (1), Barinas (1), and 4 unknown. Although collections were made every month of the year, the majority were made during March, April, May, June, and July.

REMARKS: *P. acutisternus* is generally similar to the other four species of subgroup B, particularly in the form of the female sternal plate and setae of the dorsum and venter. It most closely resembles *P. dusbabek* and *P. grandisoma* n. sp. in overall size and shape of the sternal plate. *P. acustisternus* and *P. grandisoma* n. sp. both have a rather large proximal anterodorsal seta of femur IV, patella I, tibia I, femur IV, and the proximal posterodorsal seta of femur IV. However, the female of *P. grandisoma* n. sp. is considerably larger than that of *P. acustisternus* and possesses flattened, serrated setae ventrally on some leg segments, whereas *P. acutisternus* lacks such specialized setae. The male of *P. acutisternus* most closely resembles the male of *P. paracutisternus* in having the large dorsal setae of tarsi III-IV distinctly barbed or serrated. However, these two differ in that the sternal setae of *P. acutisternus* is distinctly longer and the large dorsal setae of tarsi III-IV are more coarsely barbed.

Machado-Allison (1964, 1965a), who originally described this species, reported collections from *Phyllostomus elongatus*, *P. hastatus* and *Trachops cirrhosus* in Venezuela. Furman (1966), who described this species as *P. tiptoni*, in Panamá, reported collections from *P. hastatus*, *P. discolor*, *P. elongatus*, and *Trachops cirrhosus*. It has been determined in the present study that those specimens from *Trachops cirrhosus* are *P. paracutisternus* and that *P. acutisternus* is primarily parasitic on the three species of *Phyllostomus*. As noted previously in this paper, *P. acutisternus* is frequently found in association with *P. torrealbai*. Furman (1966) noted this same phenomenon among collections of these two species in Panamá. The occasional (one or two) collections of *P. acutisternus* from other chiropteran hosts are considered to be accidental host associations or work table contaminations.

Periglischrus dusbabeki Machado-Allison and Antequera, 1971
Fig. 7

Periglischrus dusbabeki Machado-Allison and Antequera, 1971: 9-13.

Description

Female: Idiosomal length, 1558 μ; greatest width, 1353 μ. Most ventral idiosomal setae small to medium sized (length 8-23 μ), except three pairs of minute setae just posterior to genital plate. Sternal plate large and robust (median length, 222 μ; greatest width, 145 μ); generally elongate rectangular in shape, with irregular margins and with anterior end bearing hat-shaped projection; anterior projection with lateral extensions projecting out anterior to first sternal setae (Fig. 7). Dorsal plate oblong-oval (median length, 518 μ; greatest width, 376 μ); posterior quarter superficially divided from anterior portion by narrow transverse suture; plate ornamented with small to large darker areas irregularly rounded. Six pairs of medium-sized (length 38-49 μ) podosomal setae located lateral to dorsal plate in groups of two, three, and one. Dorsal opisthosoma bears four or five pairs of small to minute setae. Dorsal leg setae medium to large in size, except proximal anterodorsal seta of each femur I-II, patella II, tibia II, and proximal posterodorsal seta of each femur III-IV rather small to minute. Posterodorsal setae of legs I-II, IV, and anterolateral setae of legs III-IV large, recurved. Distal posteroventral seta of each patella II, tibia I-II, and tarsus I-II superficially appears short and blunt. Most other ventral leg setae small to medium in length, some somewhat enlarged.

Male: Median length of idiosoma, 628 μ; greatest width, 484 μ. Holoventral plate somewhat spade shaped (median length, 280 μ; greatest width, 218 μ); greatest width just anterior to second sternal setae; five pairs of setae on holoventral plate medium sized (length, 47-64 μ); first sternal setae extend posteriorly just beyond first pair of pores; genital setae set rather close together. Intercoxa IV area with seven pairs of setae plus one pair of subterminal adanal setae; first pair setae minute (length less than 15 μ), but all others short, robust (length 25-28 μ). Dorsal plate oblong-oval (median length, 557 μ; greatest width, 381 μ), with posterior end narrower; posterior quarter superficially divided from anterior portion by narrow transverse band of lightly sclerotized integument; dorsal plate ornamented with moderately large, circular, darker and lighter areas, and small pores or setal bases. Six pairs of robust, medium-sized (length 42-58 μ) podosomal setae located lateral to dorsal plate; first two pairs anterior to peritremes; middle three pairs close together laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Coxal setae medium in length and rather robust, except large posterolateral seta of coxa II. Most ventral leg setae small to medium sized, robust and spinelike. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV relatively large; other antero- and posterolateral leg setae smaller. Most dorsal leg setae medium sized to large, except proximal anterodorsal seta of femur II small, and proximal posterodorsal seta of each femur III-IV minute.

Venezuelan Records (10 females, 5 males, and 3 protonymphs): the 3 collections of *P. dusbabeki* were from *Mimon crenulatum*, 2 in T. F. Amazonas in June, and the other in Apure in January. In addition, Machado-Allison and Antequera (1971) reported on 19 collections of *P.* dusbab*eki* (45 females, 3 males, and 2 deutonymphs) from the Smithsonian Venezuelan Project collection of *Mimon crenulatum*, all from Yaracuy. Of 72 specimens of *Mimon crenulatum* examined by the Smithsonian Venezuelan Project, 22 were parasitized with *P. dusbabeki*.

Remarks: In general size, *P. dusbabeki* resembles *P. acutisternus* and *P. grandisoma* n. sp. However, in other characters it is most closely related phenetically to *P. tonatii* and *P. paracutisternus e. g.*, proximal anterodorsal seta of femur I, patella I, tibia I, femur IV, and proximal posterodorsal seta of femur IV are small to minute in size rather than large as in *P. acutisternus* and *P. grandisoma* n. sp.; and in the male the ventral setae (sternal and intercoxae IV) are small. The form of the sternal plate in *P. dusbabeki* is quite distinctive (see Fig. 7). This species has been recorded only from *Mimon crenulatum* in Venezuela.

Periglischrus grandisoma n. sp.
Fig. 8, 32-41

Description

Female: (Holotype). (Fig. 8, 32-37). *Venter*: Sternal plate jug shaped; posterior end broad, truncate; lateral sides broadly rounded; anterior end narrows sharply between first sternal setae with narrowly rounded anterior projection. Three pairs of sternal setae in close lateral proximity to plate margins, with metasternal setae just posterior to third sternal setae; sternal

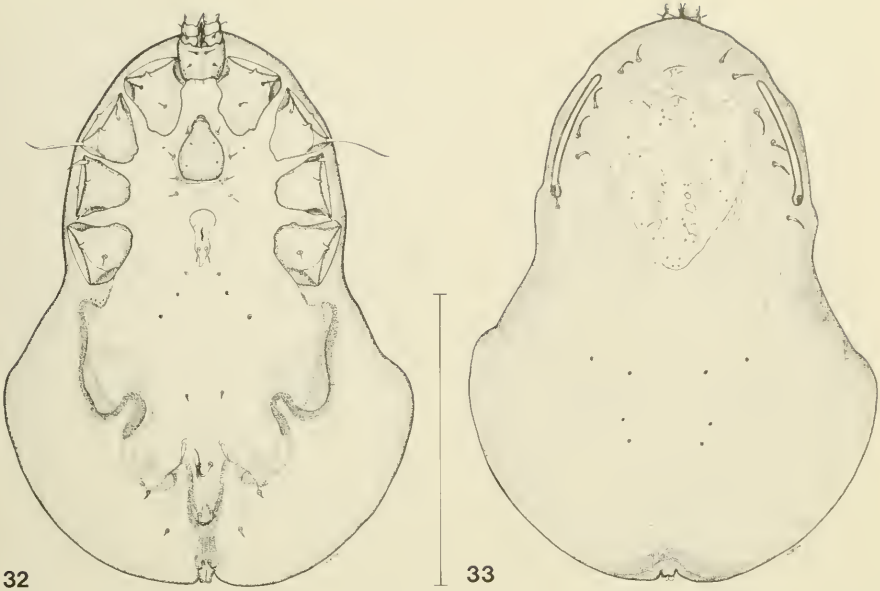

Fig. 32-33. *Periglischrus grandisoma* n. sp., female. (32) venter; (33) dorsum, scale = 1000 μ.

plate with narrow dark border; two pairs of circular pores located near lateral margins. Genital plate with greatly expanded anterior portion and narrow blunt or acute posterior end; plate slightly expanded at level of genital setae; genital setae of medium size and set on plate. Three pairs of setae behind genital plate minute, bifid, or rudimentary and appearing absent except for setal bases. Remaining seven pairs of ventral opisthosomal setae small and broad to relatively large and slender, some with distinct serrations; pair of medium-sized adanal setae just anterior to terminal anal orifice. Ventral opisthosoma with curiously shaped, heavily sclerotized bilateral areas. *Dorsum*: Peritreme dorsal, lying over coxae II and III; of normal length and width for genus. Dorsal plate oblong-oval with posterior end narrower; posterior quarter superficially appearing divided from anterior portion by narrow transverse band of lightly sclerotized integument; plate ornamented with mostly large irregularly circular, darker areas and small circular pores or setal bases. Dorsal podosoma with six pairs of medium-sized to large setae lateral to dorsal plate; first two pairs anterolateral to plate and anterior to peritremes; middle three pairs between dorsal plate and peritremes; sixth pair posterior to stigmata. Dorsal opisthosoma with four or five pairs of minute to rudimentary setae. *Legs*: Coxae variously sculptured with suture lines; coxa I with two small to medium-sized setae, distal one larger than proximal; coxa II with small, anterolateral seta and large, long posterolateral seta; coxa III with medium-length, somewhat enlarged, serrated anterolateral seta and smooth, medium-sized posterolateral seta; coxa IV with small median seta. Anteroventral seta of each trochanter I-II, femur I-II, patella I-II, and tibia I-II flattened, greatly expanded basally on anteriorly directed side, with distinct coarse serration on expanded side, and abruptly narrowing with relatively long, slender apex; posterolateral setae of legs I-IV and anterolateral setae of legs III-IV relatively long with enlarged basal half, some flattened with distinct rather coarse serrations on all sides. Some posterolateral setae of legs I-II and anterolateral setae of legs III-IV quite large and long; other antero- and posterolateral setae small to medium sized. Most dorsal leg setae large to medium in length. *Gnathosoma*: Gnathosomal and median hypostomal setae small; ventral seta of palpal trochanter and lateroventral seta of palpal femur short, robust, and serrated; distal dorsal seta of palpal femur short, robust, spine-

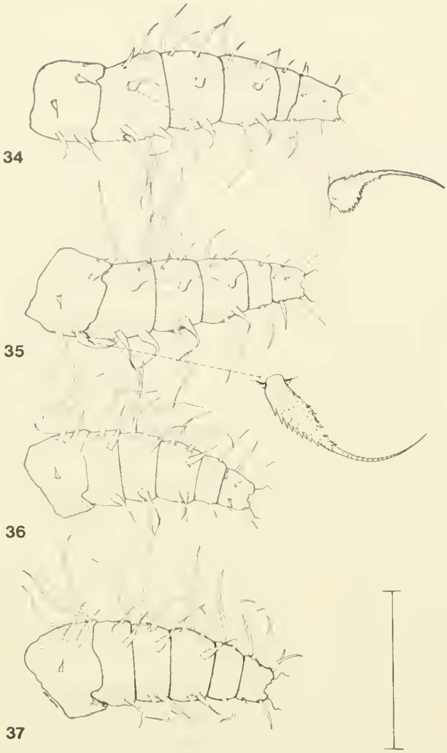

Fig. 34-37. *Periglischrus grandisoma* n. sp., female. (34) ventral view of leg I; (35) ventral view of leg II; (36) ventral view of leg III; (37) ventral view of leg IV, scale — 300 μ.

like or peglike; two laterodistal setae of palpal tibia short, peglike; other palpal setae small, setaceous. Mediodistal lobe of palpal tibia small, not prominent. *Measurements*: Idiosomal length, 1832 μ; greatest width, 1341 μ. Sternal plate length, 212 μ; greatest width, 157 μ. Sternal setae length, 28-37 μ; genital setae length, 37-38 μ; ventral opisthosomal setae length, 19-51 μ. Peritreme length, 331 μ. Dorsal plate length, 703 μ; greatest width 471 μ. Podosomal setae length, 40-85 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 545 μ; leg II, 503 μ; leg III, 415 μ; leg IV, 444 μ.

Male: (Allotype) (Fig. 38-39). *Venter*: Holoventral plate covers most of venter between coxae I-III; anterior end abruptly narrows between coxae I. Five pairs of large setae (three sternal, one metasternal, one genital) on holoventral plate; third pair of setae in medial position on plate, with other setae on or very near margins; first pair sternal setae extend posteriorly to level of second pair, well beyond first pair of pores; plate bears four or five pairs of small pores. Intercoxa IV area with seven pairs of medium-sized to large setae, except first pair behind holoventral plate small, plus pair of medium-sized adanal setae just in front of terminal anal orifice. *Dorsum*: Peritreme dorsal, lying over coxae II-III; of normal length and width for genus. Dorsal plate oval with posterior end narrower than anterior; plate with prominent anterolateral shoulders at level between coxae I-II; posterior quarter partially divided by narrow transverse band of lightly sclerotized integument; plate slightly ornamented with medium-sized, irregularly round, lighter areas and small circular pores or setal bases. Dorsal podosoma with six pairs of medium-sized setae lateral to dorsal plate; first two pairs anterolateral to dorsal plate and anterior to peritremes; next three pairs located between dorsal plate and peritremes; sixth pair set posterior to stigmata. *Legs*: Each coxa with prominent posteroventral longitudinal or diagonal ridge; all coxal setae of medium length (comparable to sternal setae) with somewhat enlarged proximal half. Most ventral leg setae short to medium in length, robust and spinelike; some anterolateral, posterolateral and dorsal setae rather large and long, most others medium in length, except proximal posterodorsal seta on femur IV rather small; most large leg setae finely serrated. *Gnathosoma*: Gnathosomal and median hypostomal setae of medium length, gnathosomal setae rather robust; some palpal setae enlarged and spinelike. No mediodistal lobe present on palpal tibia. *Measurements*: Idiosoma length, 794 μ; greatest width, 605 μ. Holoventral plate length, 368 μ; greatest width, 293 μ. Sternal and genital setae length 93-113 μ; ventral intercoxa IV setae length 41-83 μ. Peritreme length, 431 μ. Dorsal plate length, 714 μ; greatest width, 479 μ. Podosomal setae length, 34-90 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 736 μ; leg II, 606 μ; leg III, 620 μ; leg IV, 578 μ.

Female Deutonymph: Unknown

Male Deutonymph: Unknown

Protonymph: (Fig. 40-41). *Venter*: Sternal plate somewhat diamond shaped, with anterior end and posterior end rather narrowly rounded; with three pairs of rather large basally expanded setae and two pairs of small pores. Intercoxa IV area with four pairs of medium-

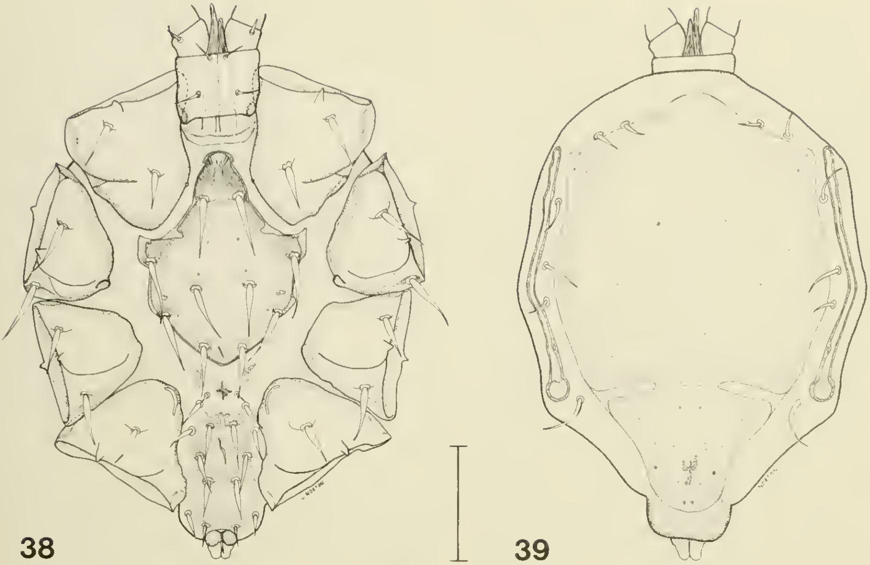

Fig. 38-39. *Periglischrus grandisoma* n. sp., male. (38) venter; (39) dorsum, scale = 200 μ.

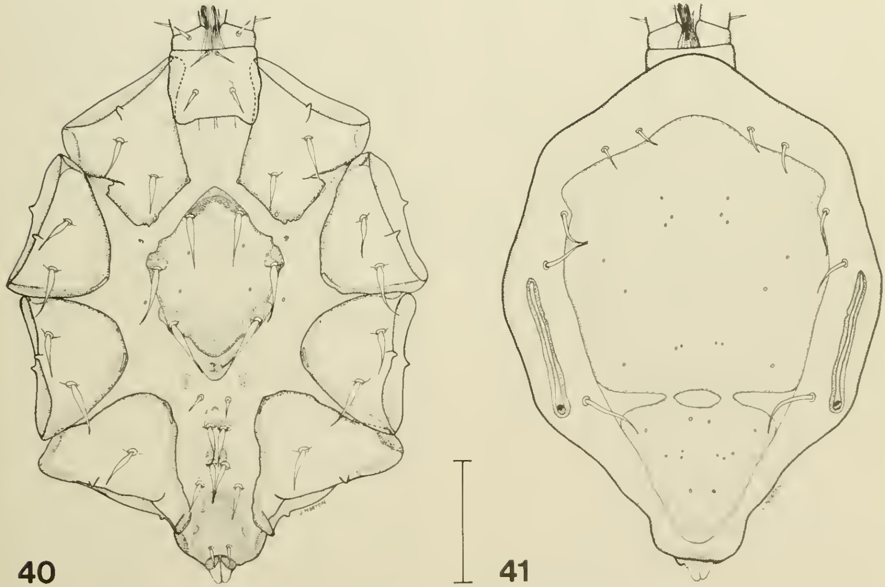

Fig. 40-41. *Periglischrus grandisoma* n. sp., protonymph. (40) venter; (41) dorsum, scale = 200 μ.

sized setae plus one pair of adanal setae; first pair small and slender but other three pairs moderately large and basally expanded. *Dorsum*: Peritreme dorsal, short, lying over coxa III. Dorsal plate oblong-oval with posterior end much narrower than anterior; posterior quarter superficially divided from anterior portion by narrow transverse strip of lightly sclerotized integument. Dorsal podosoma with five pairs of medium to large setae; first two pairs anterolateral to dorsal plate at level of coxa I; next two pairs lateral to dorsal plate just anterior to peritremes and at level of coxa II; fifth pair just medial to stigmata. *Legs*: All coxal setae moderately large with expanded basal half. Most ventral leg setae relatively short to medium in length, enlarged (some only basally), spinelike or peglike. Some anterolateral, posterolateral, and dorsal setae large and long; proximal dorsal setae of femur III and posterodorsal seta of femur IV small to minute; other leg setae of medium length. *Gnathosoma*: Gnathosomal and median hypostomal setae of medium length, with gnathosomal setae somewhat enlarged; lateral and distal hypostomal setae absent. Palpal setae short to medium in length with most somewhat enlarged, some spinelike; two laterodistal setae on tibia peglike. *Measurements*: Idiosoma length, 776 μ; greatest width, 583 μ. Sternal plate length, 266 μ; greatest width, 224 μ. Sternal setae length, 89-97 μ; intercoxa IV setae length, 31-64 μ. Peritreme length, 215 μ. Dorsal plate length, 697 μ; greatest width, 486 μ. Dorsal podosomal setae length, 39-100 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 581 μ; leg II, 529 μ; leg III, 460 μ; leg IV, 485 μ.

Type Material: Holotype female, allotype male, 15 paratype females, 1 paratype male, and 1 paratype protonymph (SVP-26298) from *Phylloderma stenops*, San Juan Río Manipiare (155 m), 163 km ESE Pto. Ayacucho, T. F. Amazonas, Venezuela, 13 July 1967.

Venezuelan Records (16 females, 4 males, and 4 protonymphs): Only 5 collections of *P. grandisoma* were recorded, all from the bat, *Phylloderma stenops*, in T. F. Amazonas, during the months of January, March, April, and July. This spinturnicid mite was recorded from 5 of 28 *Phylloderma stenops* specimens collected.

Remarks: *P. grandisoma* is most similar to *P. acutisternus* and *P. dusbabeki* in overall size and the general form of the sternal plate. However, it differs from all other species in several significant characters. It is a very large species (female idiosomal length greater than 2000 μ), and one ventral seta on each leg segment is flattened, with the basal portion expanded on one side, with the distal portion slender and acute, and with distinct serrations on the expanded side; also each leg segment bears one posteroventral seta which is robust and coarsely serrated on all sides. The male of *P. grandisoma* lacks these specialized leg setae, but the general body size and the dorsal and ventral setae are quite distinctive.

P. grandisoma is known only from *Phylloderma stenops* in Venezuela. In four of the five collections it was found in association with *P. paratorrealbai* n. sp. This synoxenous association between these two species seems to be identical to that between *P. acutisternus* and *P. torrealbai*. Of particular interest is the phenetic similarity between *P. grandisoma* and *P. acutisternus* and between *P. torrealbai* and *P. paratorealbai* n. sp.

Subgroup C

The formation of this subgroup is based entirely on phenetic characters rather than host-parasite associations. The two species of this subgroup, *P. torrealbai* and *P. paratorrealbai* n. sp., are easily distinguished by the two or five grossly enlarged ventral setae posterior to the sternal plate and by the short spinelike or peglike ventral setae on legs I and II. *P. torrealbai* parasitizes species of the genus *Phyllostomus* in association with *P. acutisternus*, and *P. paratorrealbai* n. sp. is found on *Phylloderma stenops* in association with *P. grandisoma*.

Periglischrus torrealbai Machado-Allison, 1965
Fig. 9

Periglischrus torrealbai Machado-Allison, 1965a: 276-279.

Periglischrus inflatiseta Furman, 1966: 134-135.

Description

Female: Idiosomal length, 779 μ; greatest width, 513 μ. First three pairs of sternal setae slender, small to medium sized (length 17-24 μ); metasternal setae, genital setae, and three pairs of ventral opisthosomal setae greatly expanded basally but with finely acute tips (length 30-44 μ); first pair of setae posterior to genital plate and posteriormost opisthosomal setae mostly slender, small (length 10-17 μ). Sternal plate broadly pear shaped (median length, 117 μ; greatest width, 113 μ); posterior margin slightly invaginated; lateral sides and anterior end broadly rounded (Fig. 9). Dorsal plate broadly oval (median length, 331 μ; greatest width, 247 μ); posterior quarter widely divided from anterior portion but joined by two median bridges; plate ornamented with darker circular areas, one median longitudinal light strip, and several small pores or setal bases. Six pairs of small to minute (length 10-12 μ)podosomal setae present lateral to dorsal plate; first pair anterior to dorsal plate; second pair at anterior end of peritremes; middle three pairs laterally between dorsal plate and peritremes; sixth pair just posterior to stigmata. Dorsal opisthosoma with four or five pairs of minute setae. Dorsal leg setae minute to large; most lateral and ventral leg setae small to medium sized, however, ventral setae of trochanters I-II, femora I-II, patella II, and one posteroventral seta of each tarsi I-II short, enlarged and peglike.

Male: Median length of idiosoma, 420 μ; greatest width, 420 μ. Holoventral plate generally spade shaped (median length, 196 μ; greatest width, 165 μ), covering almost entire venter between coxae I-III; five pairs of setae on holoventral plate slender, moderately long (length, 48-59 μ); first pair of sternal setae extend posteriorly beyond first pair of pores almost to level of second sternal setae. Intercoxa IV area with seven pairs of setae plus one pair of subterminal adanal setae; first pair minute (length less than 13 μ); all others medium in length (21-37 μ); however, three pairs just behind first minute pair unusually expanded and enlarged. Dorsal plate oval (median length, 374 μ; greatest width, 258 μ), with posterior end narrower; posterior quarter superficially divided from anterior portion by narrow transverse band of lightly sclerotized integument but joined by two median bridges. Six pairs of small (length 19-25 μ), robust podosomal setae present lateral to dorsal plate; first two pairs anterolateral to dorsal plate anterior to peritremes; middle three pairs laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Coxal setae medium sized, except smaller spinelike anterolateral seta of coxa III; posterolateral seta of coxa II not distinctly larger than other coxal setae. Ventral leg setae generally small to medium in length; however, most ventral setae of legs I-II considerably enlarged, spinelike, or peglike, and most ventral setae of legs III-IV slightly robust and spinelike. Antero- and posterolateral leg setae small to medium sized, some robust and spinelike. Dorsal leg setae either large or rather small; distal setae of trochanters II-IV, femora I-IV, patella I-IV, and proximal setae of tarsi III-IV large; large distal dorsal setae of legs III-IV distinctly serrated; all other dorsal leg setae smaller, with proximal anterodorsal seta of femur II, and proximal posterodorsal seta of femur III and IV minute.

Venezuelan Records (219 females, 152 males, 30 deutonymphs, and 42 protonymphs): of the 175 collections of *P. torrealbai*, 159 were from species of *Phyllostomus* (*P. hastatus*, 89; *P. discolor*, 64; and *P. elongatus*, 6). There were also 3 collections from *Artibeus jamaicensis* and one each from *Saccopteryx bilineata*, *Macrophyllum macrophyllum*, *Phylloderma stenops*, *Leptonycteris curasoae*, *Anoura caudifer*, *Carollia perspicillata*, *Ectophylla macconnelli*, *Artibeus cinereus*, *Artibeus fuliginosus*, *Desmodus rotundus*, and *Molossops planirostris*. Collections were made in the following states and territories: T. F. Amazonas (57), Zulia (28), Falcón (22), Monagas (19), Sucre (20), Carabobo (10), Trujillo (9), Apure (3), Miranda (2), Bolívar (2), Barinas (1), Guárico (1), and Lara (1). At least 1 collection was made during every month, but the majority of collections were made from March through July.

Remarks: *P. torrealbai* and *P. paratorrealbai* n. sp. from a distinct subgroup of Pe*riglischrus* group I. These two species share the following characters which distinguish them from other species: at least two pairs of ventral setae posterior to the sternal plate of females grossly expanded basally, and certain ventral setae of legs I and II short and spinelike to peglike in both sexes. Females of *P. torrealbai* may be distinguished from those of *P. paratorrealbai* n. sp. in having five pairs of ventral body setae grossly enlarged, rather than only two pairs; by the form of the sternal plate; and by the posteroventral seta of femur IV and patella IV being inflated and bladelike rather than setaceous and recurved. The males of these two species have the large dorsal setae of tarsi III and IV coarsely barbed, as do the males of *P. acutisternus* and *P. paracutisternus*, but they differ in having certain ventral setae of legs I and II enlarged and fusiform, and the proximal anterodorsal seta of each femur I, patella I, tibia I, and patella IV smaller. The male of *P. torrealbai* may be distinguished from that of *P. paratorrealbai* n. sp. by having the several pairs of intercoxa IV setae enlarged basally, and the sternal setae longer (first pair extending well beyond level of first pair of pores).

P. torrealbai is recorded primarily from three species of *Phyllostomus*. Machado-Allison (1965a), who originally described this species, reported collections from *P. hastatus* and *P. discolor* in Venezuela; and Furman (1966), who described this same species as *P. inflatiseta*, recorded collections from *P. hastatus* in Panamá. As noted previously in this paper, and by Furman (1966), this species is frequently found in association with *P. acutisternus*.

Periglischrus paratorrealbai n. sp.

Fig. 10, 42-49

DESCRIPTION

FEMALE: (Holotype) (Fig. 10, 42-43). *Venter*: Sternal plate broadly pear shaped; anterior end considerably narrower than posterior; three pairs of small, slender sternal setae set on lightly sclerotized margins; two pairs of circular pores set well in from lateral margins; metasternal setae small and more robust, posterolateral to third sternal setae. Genital plate elongate with posterior end more narrowly rounded than anterior end; genital setae short, robust, and spinelike. First pair of setae posterior to genital plate minute; next two pairs greatly inflated with abruptly acute tips; ventral opisthosoma with eight pairs of small to medium-sized setae plus one pair of medium-sized adanal setae. Ventral opisthosoma with bilateral, curiously shaped sclerites or apodemes and poorly to well-sclerotized associated areas. *Dorsum*: Peritreme length and width normal for genus, lying over coxa II and III. Dorsal plate generally oval in shape with posterior end narrower; posterior quarter divided from anterior portion of plate by rather wide transverse band of lightly sclerotized integument but with two distinct bridges connecting two sections of plate; plate ornamented with narrow, median, distinct bridges connecting two sections of longitudinal, lightly sclerotized area, numerous subcircular darker areas of various sizes, and small pores or setal bases. Podosoma with six small to minute setae anterior and lateral to dorsal plate; first pair at anterior end of plate; second pair anterolaterally at end of peritremes; middle three pairs laterally between plate and peritremes; sixth pair adjacent to stigmata. Dorsal opisthosoma with about four pairs of minute setae. *Legs*: Coxa I with two small, slender setae, medioproximal and posterodistal in positions; coxa II with small anterolateral seta and

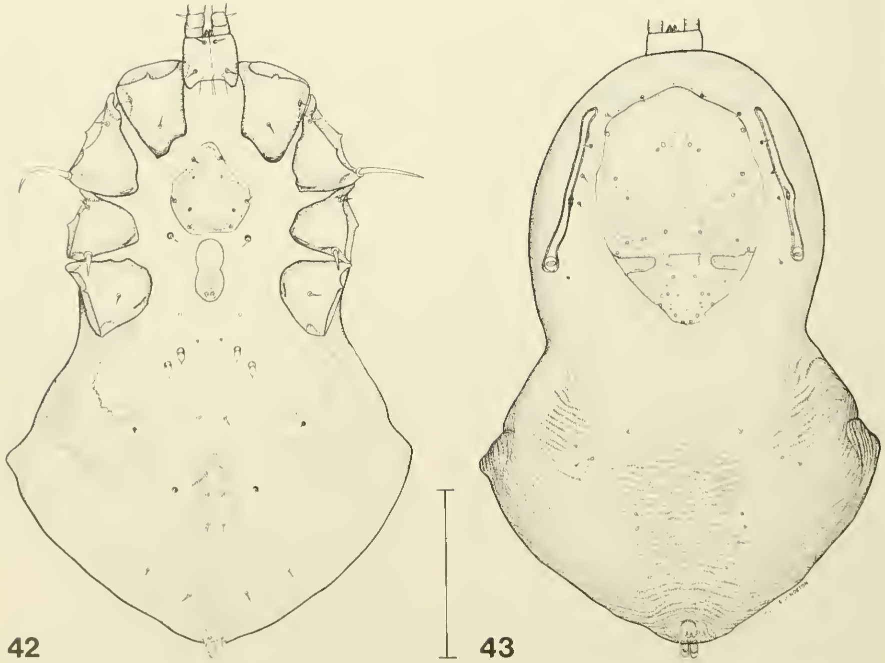

Fig. 42-43. *Periglischrus paratorrealbai* n. sp., female. (42) venter; (43) dorsum, scale = 300 μ.

medium length, robust posterolateral seta; coxa IV with small to minute median seta. Anteroventral seta of trochanter I and femur I large, bluntly spinelike; some ventral leg setae short, robust and spinelike, others of moderate length and spinelike, and few small, setaceous. Some posterolateral setae of legs I-II, IV and anterolateral setae of legs III-IV rather long, usually recurved. Distal dorsal setae of trochanters II-IV, femora I-IV, patella I-IV, tibiae III-IV, and one to several proximal setae of tarsi I-IV rather long; proximal anterodorsal seta of each femur I-IV and posterodorsal seta of femur III minute; other dorsal leg setae small to medium sized. *Gnathosoma*: gnathosomal and median hypostomal setae small; lateral and distal hypostomal setae absent or inapparent. Most palpal setae small; mediodorsal seta of palpal femur and medioventral seta of tibia short, spinelike; two pairs of laterodistal setae of palpal tibia short, peglike. *Measurements*: Idiosoma length, 953 μ; greatest width, 681 μ. Sternal plate length, 146 μ; greatest width, 129 μ. Sternal setae length, 13-16 μ; metasternal setae length, 16-18 μ; genital setae length, 10-13 μ; length first pair setae behind genital plate, 7 μ; length two pairs inflated setae posterior to genital plate, 23-25 μ; length posterior ventral opisthosomal setae, 9-21 μ. Peritreme length, 254 μ. Dorsal plate length, 379 μ; greatest width, 281 μ. Dorsal podosomal setae length, 6-18 μ; dorsal opisthosomal setae length, 6-9 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 281 μ; leg II, 294 μ; leg III, 242 μ; leg IV, 266 μ.

Male: (Allotype) (Fig. 44-45), *Venter*: Holoventral plate broadly spade shaped; four pairs of sternal setae and genital setae on plate; all located marginally except third sternal setae which are mediad and slightly anterior to fourth pair (metasternal); two pairs of circular pores on plate, first pair directly posterior to first sternal setae and second pair anterior to third pair of sternal setae. Intercoxa IV area with seven pairs of usually slender setae, plus pair of subterminal adanal setae; first pair setae posterior to genital setae minute; others small to medium in length, and in horizontal rows of two, four, four, two. *Dorsum*: Peritreme width and length usual for genus; lying over coxae II and III. Dorsal plate oval, with posterior end narrower; posterior quarter divided from anterior section by narrow transverse band of lightly sclerotized integument but with two distinct connecting bridges medially; plate slightly ornamented with narrow, median, longitudinal, light area, variable size and shape darker areas, and small pores or setal bases. Six pairs of dorsal podosomal setae short, peglike to spinelike, located lateral to dorsal plate; first two pairs set against anterolateral margins of dorsal plate an-

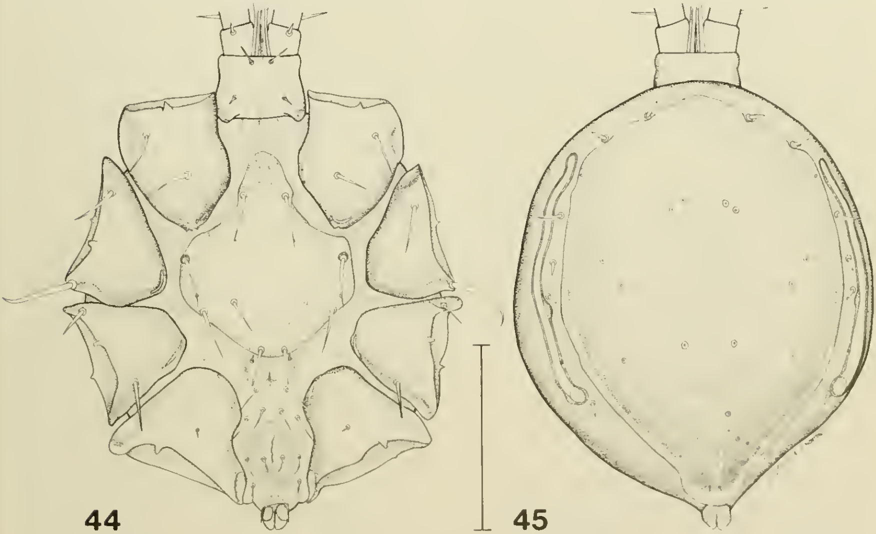

Fig. 44-45. ***Periglischrus paratorrealbai*** **n. sp., male.** (44) venter; (45) dorsum. scale = 200 μ.

terior to peritremes; middle three pairs located between dorsal plate and peritremes; sixth pair posterior to stigmata. *Legs*: Coxa I with two medium-sized setae, proximal and distal in position; coxa II with medium-sized anterolateral seta and large posterolateral seta; coxa III with small anterolateral seta and medium-sized posterolateral seta; coxa IV with minute medial seta. Anterior seta of femur I enlarged considerably peglike; some posteroventral setae of legs I-III, somewhat enlarged, spinelike or peglike; most other ventral leg setae small, setaceous. Most antero- and posterolateral setae of legs medium in length, somewhat enlarged and spinelike. Distal dorsal setae of trochanters III-IV and proximal dorsal setae of tarsi III-IV large, long, and serrated, especially those of legs III-IV; proximal anterodorsal seta of each femur I, femur II, patella II, femur III, and proximal posteroventral seta of femur III and IV minute; other dorsal leg setae small to medium in length. *Gnathosoma*: Gnathosomal and median hypostomal setae small to medium in length; lateral and distal hypostomal setae absent or inapparent. Ventral distal seta of palpal trochanter short, robust, and peglike; two pairs of laterodistal setae of palpal tibia enlarged and peglike; most other palpal setae small to medium sized. *Measurements*: Idiosoma length 411 μ; greatest width, 351 μ. Holoventral plate length, 204 μ; greatest width, 180 μ. Length of sternal and genital setae, 29-50 μ; length of intercoxa IV area setae, 13-23 μ. Peritreme length, 242 μ. Dorsal plate length, 382 μ; greatest width, 276 μ. Dorsal podosomal setae length, 13-23 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 393 μ; leg II, 311 μ; leg III, 302 μ; leg IV, 346 μ.

Female Deutonymph: (Fig. 46-47). *Venter*: Sternal plate elongate oval, with both anterior and posterior ends narrowly rounded, 3 pairs of medium-sized sternal setae on lateral margins and 2 pairs of small circular pores set in from margins. Metasternal and genital setae medium sized, posterior to sternal plate. Intercoxa IV area with 12 pairs of setae; 3 pairs medium sized, 3 pairs small, and 6 pairs minute; adanal setae small and subterminal. *Dorsum*: Peritreme length and width normal for genus, lying over coxae II and III. Dorsal plate oval, with posterior end narrower than anterior; posterior quarter superficially divided by narrow transverse band of lightly sclerotized integument, but with 2 medial connecting bridges. Six short, spinelike podosomal setae lateral to dorsal plate; first 2 pairs set close to anterolateral margins anterior to peritremes, middle 3 pairs located between dorsal plate and peritremes; sixth pair posterior to stigmata. *Legs*: Anteroventral setae of femur I, patella I, patella II, tibia II, and posteroventral setae of tarsus II short, enlarged, and peglike; most other ventral leg setae small to medium sized; some antero- and posterolateral setae of legs small to medium sized, some enlarged and spinelike, especially on leg IV. Distal dorsal setae of trochanters III-IV, femora I-IV, patella I-IV, and proximal dorsal setae of tarsi III-IV rather long and serrated, especially on leg IV; proximal anterodorsal seta of each femur I, femur II, femur III, and posterodorsal seta of femur III and femur IV minute; other dorsal setae small to medium in length. *Gnathosoma*: Gnathosomal and median hypostomal setae small yet prominent; lateral and distal hypostomal setae absent or inapparent. Distal ventral seta of palpal femur short, enlarged, and peglike; two pairs of laterodistal setae of palpal tibia not greatly enlarged but yet peglike; other palpal setae small, setaceous. *Measurements*: Idiosoma length, 553 μ; greatest width, 391 μ. Sternal plate length, 183 μ; greatest width, 134 μ. Sternal setae length, 30-41 μ; genital setae length, 37-38 μ; length of setae of intercoxa IV area, 5-29 μ. Peritreme length, 259 μ. Dorsal plate length, 307 μ; greatest width, 292 μ. Podosomal setae length, 9-20 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 352 μ; leg II, 306 μ; leg III, 290 μ; leg IV, 311 μ.

Male Deutonymph: Unknown

Protonymph: (Fig. 48-49). *Venter*: Sternal plate narrowly spade shaped; posterior end very narrowly rounded; anterior end rather broadly rounded; three pairs of sternal setae on lateral margins of plate and two pairs of small circular pores set in somewhat from margins. Intercoxa IV area with four pairs of small, slender setae, plus pair of small adanal setae just anterior to terminal anal orifice. *Dorsum*: Peritreme of normal width, but short, lying over coxa III. Dorsal plate oval with posterior end narrower than anterior; posterior quarter appearing partially divided from anterior section by narrow transverse lightly sclerotized integument, with broad median bridge. Five pairs of small podosomal setae lateral to dorsal plate; first two pairs anterolateral in position at level of coxa I; middle two pairs lateral at level of coxa II; fifth pair posterior to stigmata. *Legs*: Coxa I with two medium-sized setae, proximal and distal in position; coxa II with medium-sized anterolateral seta and slightly larger posterolateral seta; coxa III with small, almost spinelike, anterolateral seta and medium-sized posterolateral seta; coxa IV with small to minute medioventral seta.

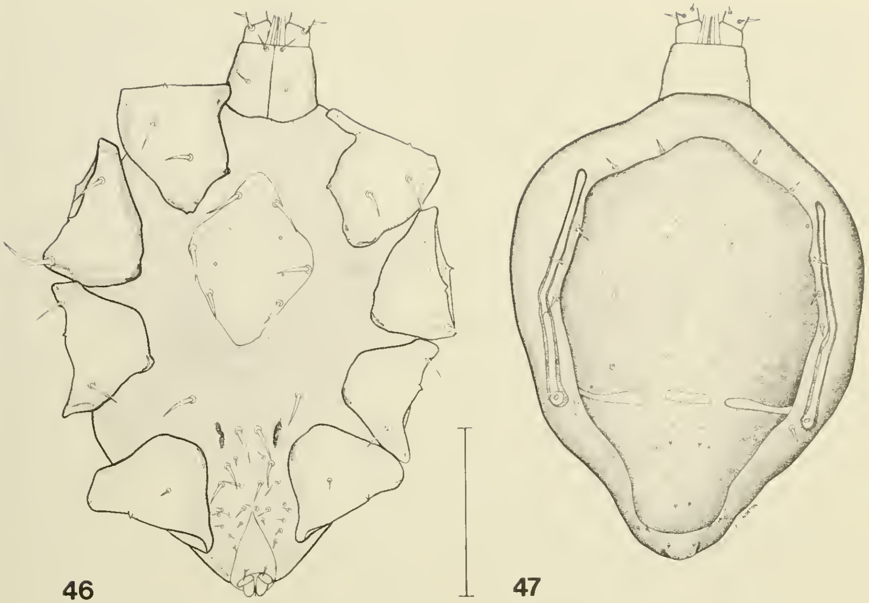

Fig. 46-47. *Periglischrus paratorrealbai* n. sp., female deutonymph. (46) venter; (47) dorsum, scale = 200 μ.

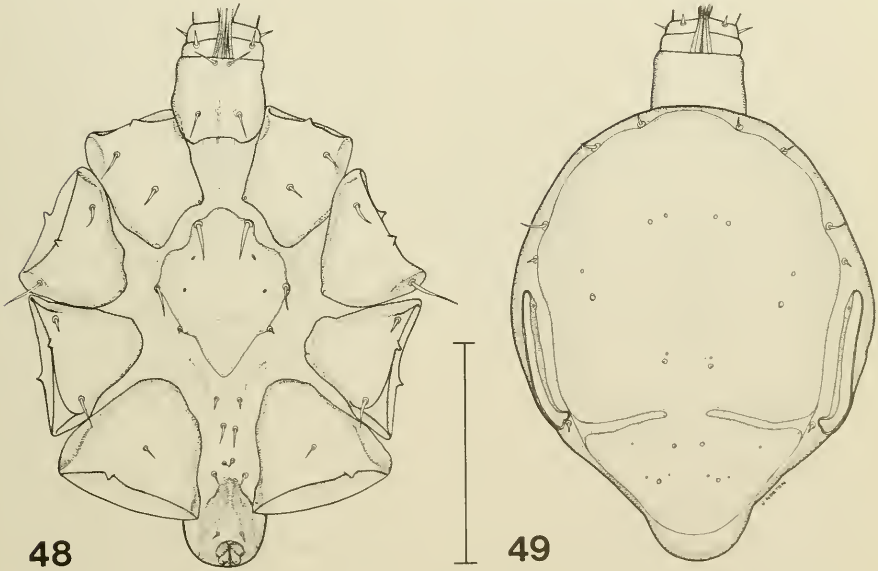

Fig. 48-49. *Periglischrus paratorrealbai* n. sp., protonymph. (48) venter; (49) dorsum, scale = 200 μ.

Most ventral setae of femora I-II, patella I-II, tibia I-II, and one seta on each tarsi I-II short, enlarged, and spinelike to peglike; other ventral leg setae small, setaceous. Antero- and posterolateral setae of legs small to medium sized and setaceous, except setae of leg IV enlarged and spinelike. Distal dorsal setae of trochanters III-IV, femora I-IV, patella I-IV, and two proximal dorsal setae of tarsi III-IV large and rather long, those of leg IV coarsely serrated; proximal anterodorsal seta of each femur I, III, and IV minute; other dorsal leg setae small to medium sized. *Gnathosoma:* Gnathosomal and median hypostomal setae small, slender; distal ventral seta of palpal trochanter short, robust, and spinelike; two laterodistal seta of palpal tibia of normal size but peglike; other palpal setae small, setaceous. *Measurements:* Idiosoma length, 368 μ; greatest width, 304 μ. Sternal plate length, 166 μ; greatest width, 124 μ. Sternal setae length, 8-34 μ; intercoxa IV setae length, 7-22 μ. Peritreme length, 235 μ. Dorsal plate length, 360 μ; greatest width, 263 μ. Podosomal setae length, 8-24 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 261 μ; leg II, 256 μ; leg III, 249 μ; leg IV, 271 μ.

Type Material: holotype female, allotype male, 3 paratype females, 10 paratype males, 3 paratype deutonymphs, and 6 paratype protonymphs (SVP-17345) from *Phylloderma stenops*, Boca Mavaca, 84 km SSE Esmeralda (138 m), T. F. Amazonas, Venezuela, 23 March 1967.

Venezuelan Records (16 females, 15 males, 3 deutonymphs, and 6 protonymphs): 4 collections were from *Phylloderma stenops* in T. F. Amazonas during the months of January, March, April, and July. One collection of 6 females was from *Tonatia bidens* in Zulia during February.

Remarks: The differentiating characters as well as the differences and similarities between *P. paratorrealbai* and *P. torrealbai* have already been discussed in the Remarks section of *P. torrealbai*. It is sufficient here to note that this species is easily distinguished by the two pairs of grossly enlarged ventral body setae of females, the shape of the sternal plate, and the slender distinctive arrangement of the intercoxa IV setae of the males.

P. paratorrealbai is found primarily on *Phylloderma stenops* and in association with *P. grandisoma*. In all four collections of this species, *P. grandisoma* was found also.

Group II

This major group of *Periglischrus* is composed of six species assigned to two subgroups. The main distinguishing characteristic of this group is the possession of six large, long, robust, dorsal podosomal setae. In addition to phenetic similarities, five of the six species of the group parasitize bats of the subfamily Glossophaginae (family Phyllostomidae); *P. hopkinsi* is parasitic primarily on *Desmodus rotundus* (subfamily *Desmodontinae*).

Subgroup A

The four species of this subgroup (*P. caligus*, *P. paracaligus* n. sp., *P. paravargasi* n. sp., and *P. vargasi*) are rather closely related phenetically as well as in host-parasite associations. There is something of a phenetic similarity gradient from *P.* caligus to *P. vargasi*, in the order listed above. The species of this subgroup may be distinguished by the large, long, dorsal podosomal setae, with the distance between the first and second pairs distinctly greater than the distance between the second and third pairs, and by the small to minute proximal anterodorsal seta of each femur I, patella I, tibia I, and tibia II. The species of this subgroup parasitize bats of the closely related genera *Glossophaga*, *Anoura*, and *Leptonycteris*.

Periglischrus caligus Kolenati, 1857

Fig. 11

Periglischrus caligus Kolenati, 1857:60

Periglischrus setosus Machado-Allison 1964: 199-200

Description

Female: Idiosoma length, 952 μ; greatest width, 782 μ. All ventral setae small to minute (length less than 10-15 μ). Sternal plate angularly jug shaped (median length, 115 μ; greatest width, 91 μ); five sides (margins) of plate almost straight with anterior projection narrowly rounded (Fig. 11). Dorsal plate oblong-oval (median length, 358 μ; greatest width, 255 μ); posterior quarter divided from anterior portion only by faint superficial suture; plate ornamented with irregularly round, medium to large, darker areas and small pores or setal bases. Six pairs of large (length 62-76 μ) setae present lateral to dorsal plate; first five pairs mostly equidistant from each other; sixth pair located posterior to stigmata. Dorsal opisthosoma with four pairs of minute setae. Dorsal leg setae mostly large to medium sized, except proximal anterodorsal seta of each femur I-II, patella II, tibia II, and proximal posterodorsal seta of each femur II-IV, patella I and tibia II small to minute; posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV rather large, recurved; posterolateral setae of femur, patella, and tibia of legs IV greatly inflated, recurved. Most ventral leg setae small; however, some anteroventral setae of legs I-IV and posteroventral setae of legs II somewhat enlarged and serrate.

Male: Median length of idiosoma, 366 μ; greatest width, 284 μ. Holoventral plate somewhat pear-shaped (median length, 182 μ; greatest width, 155 μ), covering almost entire venter between coxae; five pairs of seta on holoventral plate small (length 15-27 μ); first sternal setae extend posteriorly about two-thirds distance to first pair of pores. Intercoxa IV area bears seven pairs of setae plus pair of subterminal adanal setae; first pair very minute; other setae small (length 14-19 μ). Dorsal plate oblong-oval (median length, 342 μ; greatest width, 223 μ); posterior end narrower; posterior quarter superficially divided from anterior portion by narrow transverse band of lightly sclerotized integument. Six pairs of medium-sized (length 24-45 μ) podosomal setae present lateral to dorsal plate; first two pairs located anterolateral to dorsal plate and anterior to peritremes; middle three pairs laterally between dorsal plate and peritremes; sixth pair located posterior to stigmata. Coxal setae small to medium in length; proximal seta of coxa I distinctly smaller than distal seta; anterolateral seta of coxa III and seta of coxa IV small; two setae of coxae II and posterolateral seta of coxa III considerably longer. Ventral leg setae small, some slightly robust. Antero- and posterolateral setae of legs small to medium sized, some slightly recurved. Dorsal leg setae range in size from minute to large, robust; distal dorsal setae of trochanters II-IV, femora I-IV, patella I-IV, tibia III-IV, and basal dorsal setae of tarsi III-IV decidedly larger than all others; proximal anterodorsal seta of each femur I, femur II, femur III, and posterodorsal seta of femur III and femur IV minute.

Venezuelan Records (448 females, 91 males, 24 deutonymphs, 25 protonymphs, and 3 specimens in alcohol): Of the 225 collections, 129 were from *Glossophaga longirostris*, 87 from *G. soricina*, 4 from *Desmodus rotundus*, 2 from *Artibeus jamaicensis*, and 1 each from *Pteronotus parnellii*, *Phyllostomus hastatus*, and *Sturnira lilium*. Collections were made in the following states and territories: Apure (51), Falcón (43), T. F. Amazonas (38), Nueva Esparta (17), Barinas (17), Bolívar (14), Guajira (10), Sucre (9), Zulia (9), Miranda (8), Yaracuy (2), Guárico (2), Trujillo (1), Monagas (1), and Carabobo (1). They varied in elevation from sea level to 851 m, with a majority (92) from elevations below 100 m. Collections were made in all months of the year as follows: January (20), February (9), March (3), April (11), May (4), June (47), July (34), August (4), September (5), October (11), November (10), and December (65).

Remarks: *P. caligus* is easily distinguished from *P. vargasi* in the female by the broadly inflated posterolateral seta of each femur IV, patella IV, and tibia IV; the distinctive ornamentation of the dorsal plate; and the sclerotization and apparent form of the sternal plates (Fig. 11, 14). The other two species of the subgroup (*P. paracaligus* n. sp. and *P. paravargasi* n. sp.) are intermediate in phenetic characters between *P. caligus* and *P. vargasi*. The *P. caligus* female may be distinguished from females of these two closely related species by the presence of five pairs of small to minute dorsal opisthosomal setae, rather than six pairs (the anteriormost three to four pairs of which are long to medium in length), and by the form of the anterior projection of the sternal plates. In the male of *P. caligus*, the posterolateral seta of coxa II is much shorter than the width of coxa II, and the intercoxa IV area bears eight pairs of setae.

P. caligus is found primarily on species of the genus *Glossophaga*. This species was originally described from *G. soricina* in Brazil and Surinam (Kolenati, 1857). Machado-Allison (1964, 1965a) erroneously described specimens of this species from *G. longirostris* and *G. soricina* in Venezuela as *Periglischrus setosus*. In his addendum, Furman (1966) considered *P. setosus* to be a synonym of *P. caligus*, an opinion which was subsequently considered valid by Machado-Allison and Antequera (1971). Furman (1966) recorded *P. caligus* from *G. soricina* in Panamá. In the present study, 216 of the 225 collections were from *G. longirostris* (129) and *G. soricina* (87).

Periglischrus paracaligus n. sp.

Fig. 12, 50-58

Description

Female (Holotype): (Fig. 12, 50-52). *Venter*: Sternal plate broadly jug shaped; greatest width anterior to second sternal setae; posterior margin almost straight, anterior end narrowing abruptly to form narrow, blunt anterior projection. Three pairs of small sternal setae located on lateral margins of plate, two pairs of circular pores on plate; metasternal setae minute, located posterior to sternal plate. Genital plate

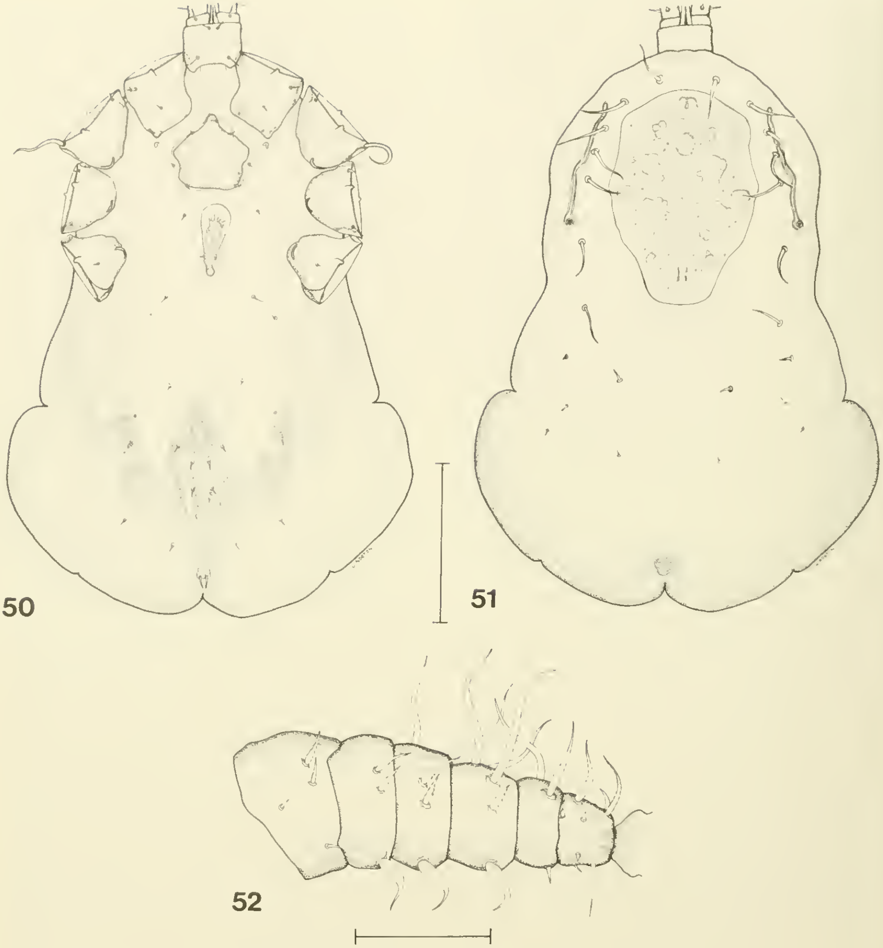

Fig. 50-52. *Periglischrus paracaligus* n. sp., female. (50) venter; (51) dorsum, scale = 300 μ; (52) ventral view of leg IV, scale = 100 μ.

elongate; anterior end rather broadly rounded; posterior end narrowly rounded; genital setae minute, set on lateral margins of plate. First two pairs of setae posterior to genital plate vestigial, represented only by setal bases; ventral opisthosoma with eight pairs of minute to small setae, plus one pair of small adanal setae. Ventral opisthosoma with curiously shaped, heavily sclerotized bilateral areas. *Dorsum*: Peritreme dorsal; lying over coxae II and III; of normal length and width for genus. Dorsal plate oblong-oval; posterior end narrower and broadly rounded; posterior quarter not divided, with only faint indication of suture line medially; plate distinctly ornamented with numerous small, subcircular darker areas and several larger irregular-shaped lighter areas, plus small circular pores or setal bases. Dorsal podosoma with six pairs of large setae lateral to dorsal plate; first pair located at anterior end of plate;

middle four pairs equidistant from each other laterally between dorsal plate and peritremes; sixth pair located posterior to stigmata. Dorsal opisthosoma with six pairs of setae; first pair just posterior to level of coxa IV and dorsal plate slender, rather long; next three pairs small to medium sized; posterior two pairs small to minute. *Legs*: Coxa I with two small setae, proximal and distal in position; coxa II with small anterolateral seta and large, long posterolateral seta; both antero- and posterolateral setae of coxa III small; median seta of coxa IV minute. Posteroventral setae of most segments of legs I-III and anteroventral setae of legs III-IV of medium length, robust and spinelike, some serrated; other ventral leg setae rather small, setaceous. Most antero- and posterolateral setae of legs small to medium sized, except posterolateral seta of each femur IV, patella IV, and tibia IV greatly inflated basally with more slender recurved end. Distal dorsal setae of trochanters II-IV, femora I-IV, patella I-IV, and tibia I-IV rather large, long; other dorsal leg setae small to medium in length. *Gnathosoma*: Gnathosomal setae minute, median hypostomal setae of medium length. Palpal setae small to minute; dorsal seta of palpal femur spinelike; two pairs of laterodistal setae of palpal tibia small, peglike. Mediodistal lobe of palpal tibia small to inapparent. *Measurements*: Idiosoma length, 1004 μ; greatest width, 727 μ. Sternal plate length, 135 μ; greatest width, 136 μ. Sternal setae length, 12-16 μ; genital setae length, 6-8 μ; ventral opisthosomal setae length, 8-19 μ. Peritreme length, 177 μ. Dorsal plate length, 385 μ; greatest width, 270 μ. Podosomal setae length, 68-98 μ; first dorsal opisthosomal setae length, 56 μ; second three pairs of dorsal opisthosomal setae length, 12-30 μ; last two pairs of dorsal opisthosomal setae length, less than 12 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 311 μ; leg II, 241 μ; leg III, 253 μ; leg IV, 276 μ.

Male: (Allotype): (Fig. 53-54). *Venter*: Holoventral plate covers most of venter between coxae I-III; anterior end narrows moderately between coxae I; point of greatest width just posterior to second sternal setae; lightly sclerotized border present posterior to first sternal setae. Sternal setae 1 and 2, metasternal setae and genital setae on or very near margins of plate, whereas third sternal setae set in slightly anterior and mediad to metasternal setae; genital setae close together on posterior margin; setae of holoventral plate small to medium sized; first sternal setae do not extend posteriorly to level of first pair of pores. Intercoxa IV area with six pairs of setae, plus one pair of subterminal adanal setae; first pair posterior to holoventral plate minute; all others small to medium sized. *Dorsum*: Peritreme dorsal; lying over coxae II and III, of normal length and width for genus. Dorsal plate oblong-oval, but narrower posteriorly; posterior quarter superficially divided from anterior portion by faint suture line laterally and medially; plate ornamented by lighter and darker areas of variable shape and size, with small pores or setal bases. Dorsal podosoma with six pairs of medium length, robust, almost spinelike setae lateral to dorsal plate; first two pairs anterolateral to dorsal plate and anterior to peritremes; middle three pairs located between dorsal plate and peritremes; sixth pair posterior to stigmata. *Legs*: Coxa I with two slender, small to medium-sized setae, proximal and distal in position; coxa II with medium-sized anterolateral seta and somewhat larger posterolateral seta; anterolateral seta of coxa III small and enlarged somewhat basally, posterolateral seta medium sized; medial seta of coxa IV small. Most ventral leg setae small, some antero- and posteroventral setae spinelike. Most antero- and posterolateral setae of legs smaller, some robust. One or both distal dorsal setae of trochanter II-IV, femur I-IV, and patella I-IV rather large, long; other dorsal leg setae small to medium in length. *Gnathsoma*: Gnathsomal and median hypostomal setae medium in length; lateral and distal hypostomal setae absent or inapparent. Distal ventral setae of palpal trochanter, distal dorsal seta of palpal femur, and lateral seta of palpal femur short, robust, and spinelike; most other palpal setae small, some spinelike; two pairs of laterodistal setae of palpal tibia small, peglike. No mediodistal lobe present on palpal tibia. Spermatophore process of moderate length and recurved. *Measurements*: Idiosoma length, 409 μ; greatest width, 331 μ. Holoventral plate length, 203 μ; greatest width 174 μ. Sternal and genital setae length, 24-33 μ; intercoxa IV setae length (excluding first pair of minute setae), 14-22 μ. Peritreme length, 239 μ. Dorsal plate length, 319 μ; greatest width, 262 μ. Podosomal setae length, 30-54 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 334 μ; leg II, 266 μ; leg III, 290 μ; leg IV, 358 μ.

Female Deutonymph: (Fig. 55-56). *Venter*: Sternal plate oval; anterior and posterior ends broadly rounded; 3 pairs of small sternal setae on lateral margins of plate; 2 pairs of pores set in somewhat from margins of plate; metasternal setae small, posterolateral to third

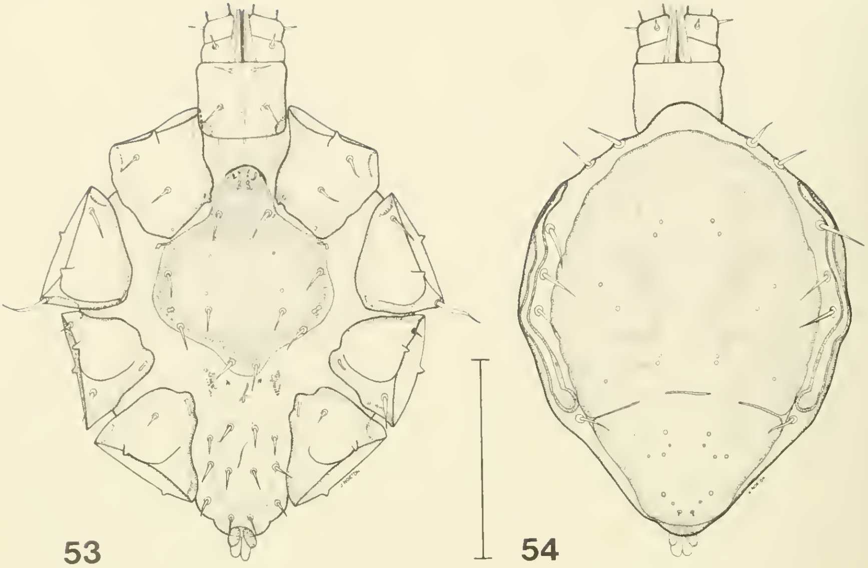

Fig. 53-54. *Periglischrus paracaligus* n. sp., male. (53) venter; (54) dorsum, scale = 200 μ.

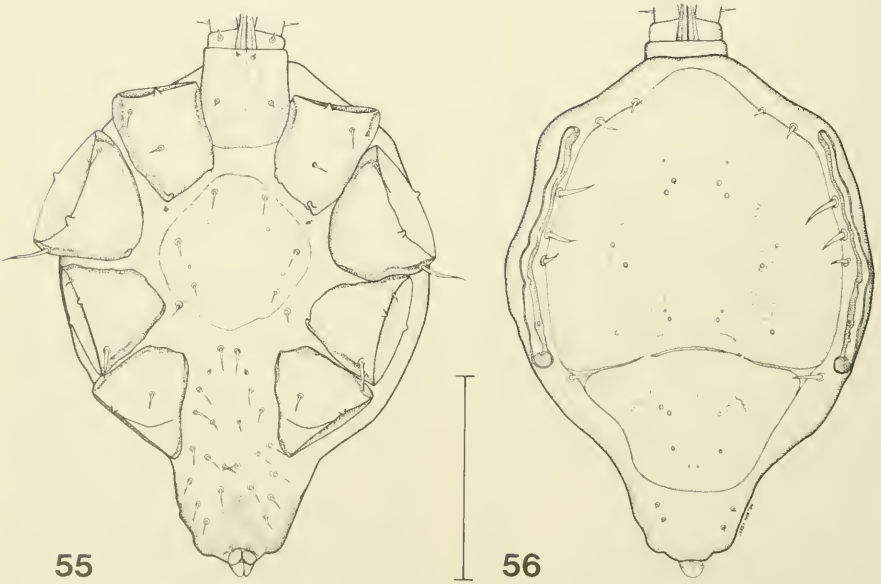

Fig. 55-56. *Periglischrus paracaligus* n. sp., female deutonymph. (55) venter; (56) dorsum, scale = 200 μ.

sternal setae. Genital setae of medium length; close together, posterior to sternal plate. First pair of setae posterior to genital setae very minute; intercoxa IV area with 10 pairs of small setae in addition to first minute pair, plus 1 pair of small, subterminal, adanal setae. *Dorsum*: Peritreme dorsal, lying over coxae II and III; length and width normal for genus. Dorsal plate generally oval; posterior quarter superficially divided from anterior portion by only narrow suture line; plate ornamented with lighter and darker areas of irregular size and shape and small pores or setal bases. Dorsal podosoma with six pairs of medium-sized, robust, spinelike setae; first 2 pairs anterolateral to dorsal plate and anterior to peritremes; middle 2 pairs located between dorsal plate and peritremes; sixth pair located posterior to stigmata. Dorsal opisthosoma posterior to dorsal plate with 3 to 4 pairs of small setae. *Legs*: Coxa I with 2 slender, small to medium-length setae, proximal and distal in position; coxa II with anterolateral setae slender, of medium length, and posterolateral seta of medium length but quite robust; anterolateral seta of coxa III small, posterolateral seta medium sized; single median seta of coxa IV small. Most ventral leg setae small, some rather robust, spinelike. Antero- and posterolateral setae small, some especially on leg IV, more robust, spinelike. One or both distal dorsal setae of trochanters II-IV, femora I-IV, and patella I-IV rather large, long; most other leg setae small. *Gnathosoma*: Gnathosomal and 1 pair of hypostomal setae small; other hypostomal setae absent or inapparent. Palpal setae small, some short, robust, spinelike; 2 pairs of laterodistal setae of palpal tibia small, peglike. *Measurements*: Idiosoma length, 483 μ; greatest width, 363 μ; sternal plate length, 151 μ; greatest width 149. Sternal setae length, 12-33 μ; genital setae length, 24-26 μ; intercoxa IV setae length, 15-22 μ. Peritreme length, 233 μ. Dorsal plate length, 349 μ; greatest width, 311 μ. Dorsal podosomal setae length, 17-44 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 268 μ; leg II, 261 μ; leg III, 245 μ; leg IV, 266 μ.

MALE DEUTONYMPH: Unknown

PROTONYMPH: (Fig. 57-58). *Venter*: Sternal plate oval; broadly rounded anterior and posterior ends; three pairs of small setae on lateral margins. Metasternal and genital setae absent; intercoxa IV area with four pairs of setae plus one pair of adanal setae; first pair posterior to

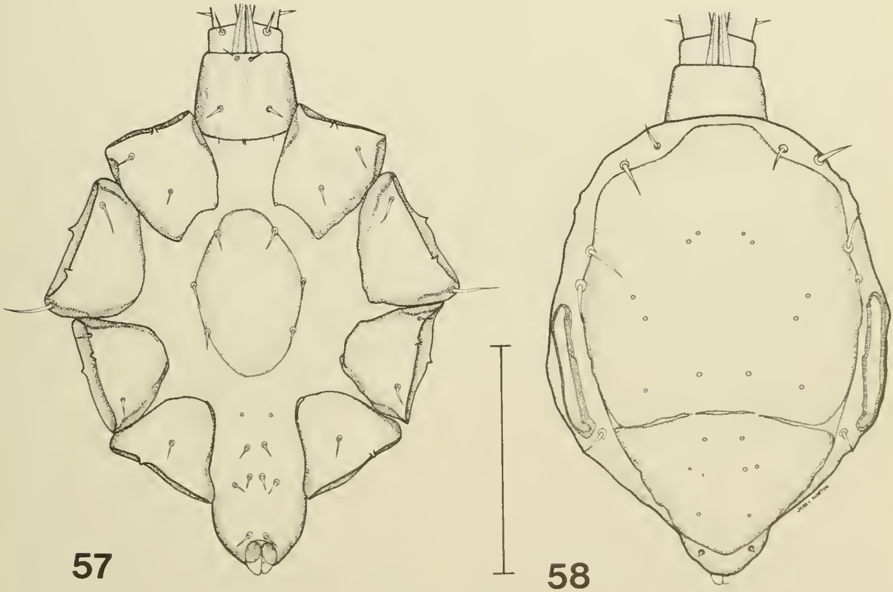

Fig. 57-58. *Periglischrus paracaligus* n. sp., protonymph. (57) venter; (58) dorsum, scale = 200 μ.

sternal plate minute, all others small. *Dorsum*: Peritreme dorsal, short, lying over coxa III. Dorsal plate oval with posterior end narrower; posterior quarter superficially divided from anterior portion by narrow transverse suture. Dorsal podosoma with five pairs of medium length, robust, somewhat spinelike setae; first two pairs anterolateral to dorsal plate at level over coxa I; middle two pairs anterior to peritremes and lateral to dorsal plate at level over coxa II; fifth pair posterior to stigmata. *Legs*: coxa I with two small setae, proximal and distal in position; coxa II with medium-length, slender, anterolateral seta and moderately large posterolateral seta; coxa III with small anterolateral seta and medium-sized posterolateral seta; coxa IV with one small median seta. Ventral leg setae small, some spinelike. Antero- and posterolateral setae small to medium sized, some recurved slightly or nearly spinelike. One or two distal dorsal setae of trochanters II-IV, femora I-IV, and patella I-IV relatively large; most other dorsal leg setae minute to small in size. *Gnathosoma*: Gnathosomal and one hypostomal setae small, slender; other hypostomal setae absent or inapparent. Palpal setae small, some short, spinelike; two pairs of laterodistal setae of palpal tibia short, peglike. *Measurements*: Idiosoma length, 405 μ; greatest width, 300 μ. Sternal plate length, 135 μ; greatest width, 129 μ. Sternal setae length, 17-22 μ; intercoxa IV seta (excluding first minute pair) length, 11-20 μ. Peritreme length, 116 μ. Dorsal plate length, 369 μ; greatest width 242 μ. Dorsal podosomal setae length, 78-137 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 263 μ; leg II, 250 μ; leg III, 205 μ; leg IV, 227 μ.

Type Material: holotype female, allotype male, 3 paratype females and 1 paratype male (SVP-23598) from *Leptonycteris curasoae*, nr. Cojoro, 36 km NNE Paraguaipoa (15 m), Zulia, Venezuela, 30 June 1968; 3 paratype females and 1 paratype deutonymph (SVP-44553) from *Leptonycteris curasoae*, Caserio Boro (528 m), 10 km N El Tocuyo, Lara, Venezuela, 14 July; and 1 paratype deutonymph (SVP-44553) from *Leptonycteris curasoae*, same locality as SVP-44428, 16 July 1968; 39 additional collections (131 females, 8 males, and 1 deutonymph) were made from the same host species and locality as SVP-44428 and SVP-44553, 14-16 July 1968.

Venezuelan Records (169 females, 16 males, 3 deutonymphs, and 2 protonymphs): all 55 collections of *P. paracaligus* were from *Leptonycteris curasoae*. Collections were made in the following states: Lara (41), Falcón (9), Nueva Esparta (4), and Zulia (1). Of the 55 specimens of *Leptonycteris curasoae* from which *P. paracaligus* were recovered, 41 were from the same location in Lara, on 14 and 16 July 1967. Other collections were made in January, February, and June.

Remarks: *P. paracaligus* is most closely related phenetically to *P. paravargasi* n. sp., differing primarily in the form of the female sternal plate (Fig. 12-13). Both resemble *P. caligus* in the broadly inflated posteroventral seta of each femur, patella, and tibia IV, and in the ornamentation of the dorsal plate. However, in the female they differ from *P. caligus* in the form of the sternal plate and in the size of the anteriormost dorsal opisthosomal setae (long to medium in length). In the male, the sternal plate is small and the first pair of sternal seta does not extend posteriorly to the level of the first pair of pores. *P. paracaligus* is known only from *Leptonycteris curasoae* collected in Venezuela.

Periglischrus paravargasi n. sp.

Fig. 13, 59-69

Description

Female (Holotype): (Fig. 13, 59-61). *Venter*: Sternal plate irregularly jug shaped, greatest width anterior to second sternal setae; posterior margin broadly rounded; anterior end narrowing abruptly in front of first sternal setae forming narrow, blunt, anterior projection. Three pairs of small to minute sternal setae set on lightly sclerotized lateral margins of plate; two pairs of small circular pores set in somewhat from margins of plate; metasternal setae minute, located posterior to sternal plate. Genital plate elongate; anterior end rather broadly rounded; posterior end rather narrow; genital setae minute, set on lateral margins of plate. First two pairs of setae posterior to genital plate vestigial, represented only by setal bases; ventral opisthosoma with eight pairs of minute to small setae, plus one pair of small adanal setae. Ventral opisthosoma with curiously shaped, heavily sclerotized, bilateral areas. *Dorsum*: Peritreme dorsal; lying over coxae II and III; of normal length and width for genus. Dorsal plate oblong-oval, posterior end narrower and broadly rounded with slight indication of division of posterior quarter; plate distinctly ornamented with numerous small darker circular areas and some larger irregularly shaped lighter areas, plus very small circular pores or setal bases. Dorsal podosoma with six pairs of large setae lateral to dorsal plate, first two pairs anterolateral to plate and anterior to peritremes;

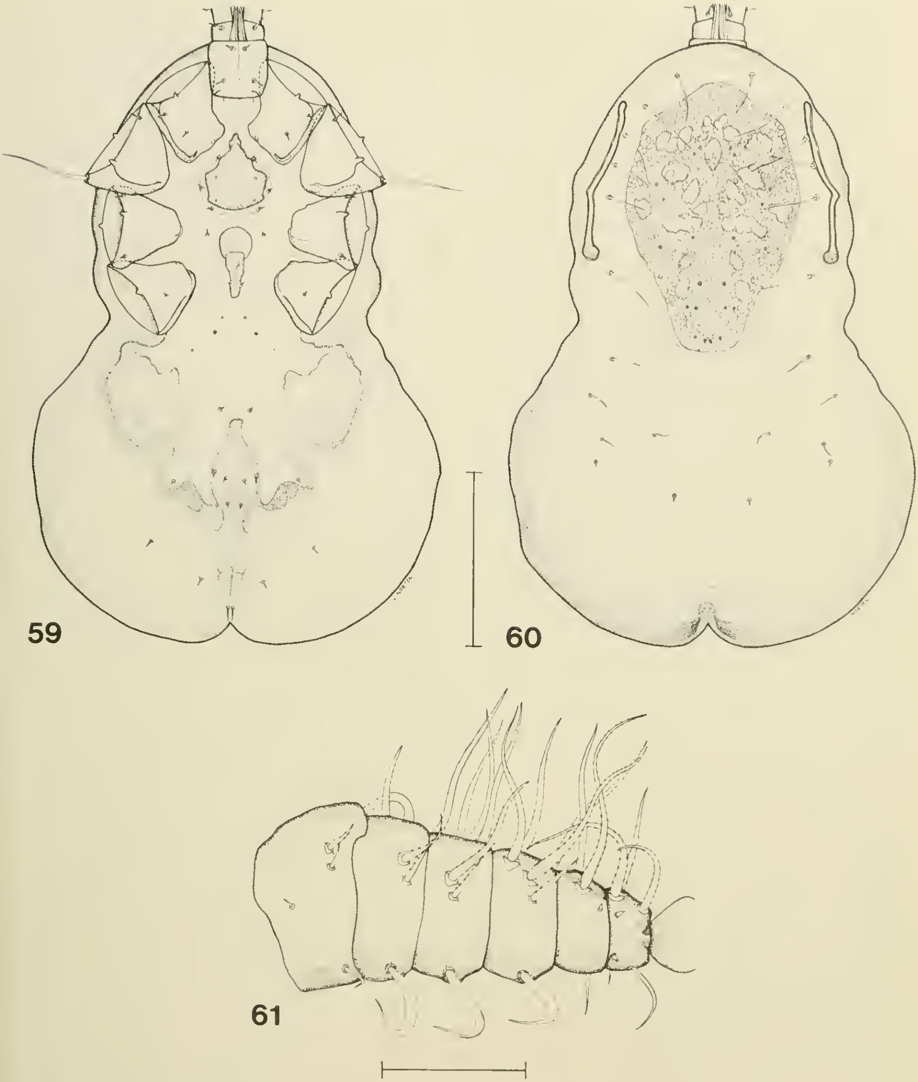

Fig. 59-61. *Periglischrus paravargasi* n. sp., female. (59) venter; (60) dorsum, scale = 300 μ; (61) ventral view of leg IV, scale = 100 μ.

middle three pairs laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Dorsal opisthosoma with six pairs of setae; first pair behind level of coxa IV rather large; next three pairs medium sized; last two pairs (posteriormost) small to minute. *Legs*: Coxa I with two small setae, proximal and distal in position; coxa II with small, inapparent anterolateral seta and large, long posterolateral seta; both antero- and posterolateral setae of coxa III small and inapparent; coxa IV with minute median seta. Posteroventral setae of most segments of legs I-III and anteroventral setae of legs III-IV medium sized, robust, and spinelike, some serrated; other ventral leg setae small, setaceous. Posterolateral setae of legs I-II and anterolateral setae of legs III-IV medium to large, some recurved; posterolateral seta of each femur, patella, and tibia of leg IV greatly inflated basally with more slender recurved end. Distal dorsal setae of trochanters II-IV, femora, I-IV, patella I-IV, and tibiae I-IV rather large, long; proximal dorsal setae of femora II-III and patella II minute; other dorsal leg setae small to medium sized. *Gnathosoma*: Gnathosomal setae and one pair of hypostomal setae small; other hypostomal setae absent or inapparent. Palpal setae small to medium sized, with some more robust and spinelike; two pairs of laterodistal setae of palpal tibia small, peglike. Mediodistal lobe of palpal tibia small. *Measurements*: Idiosoma length, 1016 μ; greatest width, 564 μ. Sternal plate length, 135 μ; greatest width, 122 μ. Sternal and genital setae length, 9-15 μ; ventral opisthosomal setae length, 6-24 μ. Peritreme length, 275 μ. Dorsal plate length, 456 μ; greatest width, 302 μ. Podosomal setae length, 78-116 μ; first dorsal opisthosomal setae length, 51 μ; second three pairs of dorsal opisthosomal setae length, 27-37 μ; last two pairs of dorsal opisthosomal setae length too minute to accurately measure. Length of legs (base of trochanter to end of tarsus): Leg I, 336 μ; leg II, 243 μ; leg III, 248 μ; leg IV, 278 μ.

Male (Allotype): (Fig. 62-63). *Venter*: Holoventral plate covers large part of venter between coxae I-III; anterior end narrows between coxae I; point of greatest width at or just anterior to second pair of setae. Sternal setae 1 and 2, metasternal setae and genital setae on margins of plate; third pair of sternal setae set in from margins anterior and mediad to metasternal setae; genital setae close together on posterior margin; setae of holoventral plate medium sized, first sternal setae extend posteriorly to level of first pair of pores. Intercoxa IV area with seven pairs of setae plus one pair of subterminal adanal setae; first pair posterior to holoventral plate minute; all others small to medium sized. *Dorsum*: Peritreme dorsal; lying over coxae II and III; of normal length and width, except undulating laterally around and between middle four pairs of podosomal setae. Soft integument of dorsum surrounding dorsal plate with undulating striations, particularly anterolaterally. Dorsal plate oblong-oval; narrower posteriorly than anteriorly; posterior quarter superficially divided from anterior portion by faint, incomplete suture line laterally and medially; plate faintly ornamented with lighter and darker areas of variable size and shape, small circular pores or setal bases, and very minute light punctae. Dorsal podosoma with six pairs of large setae lateral to dorsal

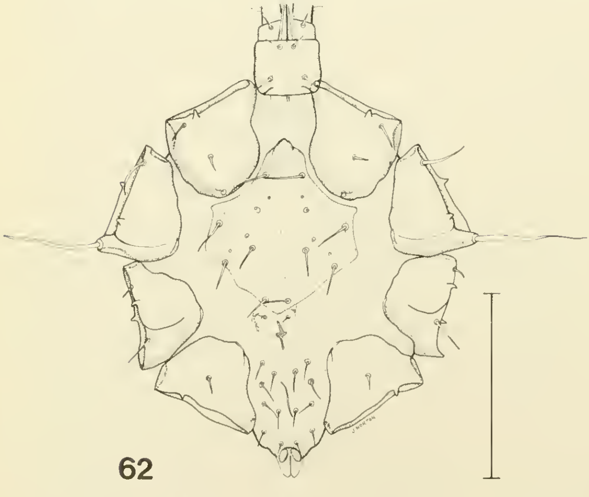

Fig. 62-63. *Periglischrus paravargasi* n. sp., male. (62) venter; (63) dorsum, scale = 300 μ.

plate; first two pairs anterolateral to dorsal plate anterior to peritremes; middle three pairs between dorsal plate and peritremes; sixth pair posterior to stigmata. *Legs*: Coxa I with small proximal seta and medium-sized distal seta; coxa II with medium-sized anterolateral seta and rather large, long posterolateral seta; coxa III with small, somewhat spinelike anterolateral seta and medium-sized posterolateral seta; median seta of coxa IV small. Most ventral leg setae small to medium sized, some antero- and posteroventral setae enlarged, spinelike; most antero- and posterolateral setae small to medium sized, some, especially on legs IV, rather long, robust. One or both distal setae of trochanters II-IV, femora I-IV, patella I-IV, and tibiae I-IV rather large, long; proximal posterodorsal seta of each femur II and III minute; other dorsal leg setae small to medium sized. *Gnathosoma*: Gnathosomal and one pair of hypostomal setae medium sized, other two pairs of hypostomal setae absent or inapparent. Palpal setae mostly small, some robust and spinelike or peglike, especially anterolateral seta of palpal femur and two pairs of laterodistal setae of palpal tibia. No mediodistal lobe present on palpal tibia. Spermatophore process of moderate length and recurved. *Measurements*: Idiosoma length, 603 μ; greatest width, 477 μ. Holoventral plate length, 281 μ; greatest width, 252 μ. Sternal and genital setae length, 46-71 μ; intercoxa IV setae length (excluding first pair of minute setae), 20-35 μ. Peritreme length, 315 μ. Dorsal plate length, 515 μ; greatest width, 355 μ. Podosomal setae length, 74-106 μ. Length of legs (base of trochanter to end of tarsus): Could not be measured because legs were curled up too much.

FEMALE DEUTONYMPH: (Fig. 64-65). *Venter*: Sternal plate oval; anterior end more broadly rounded than posterior; 3 pairs of small to medium-sized sternal setae on lateral margins of plate; 2 pairs of small pores set in somewhat from margins; metasternal setae larger than and posterolateral to third sternal setae; genital setae medium sized, close together posterior to sternal plate. First pair setae posterior to genital setae minute; intercoxa IV area with additional 10 pairs of mostly small setae plus 1 pair of subterminal adanal setae. *Dorsum*: Peritreme dorsal; lying over coxae II and III; length and width normal for genus, except slightly undulating laterally around and between middle 3 pairs of podosomal setae. Dorsal plate generally oval; posterior quarter superficially divided from anterior portion by narrow suture line; plate slightly ornamented with lighter and darker areas of variable size and shape. Dorsal podosoma with 6 pairs of large setae lateral

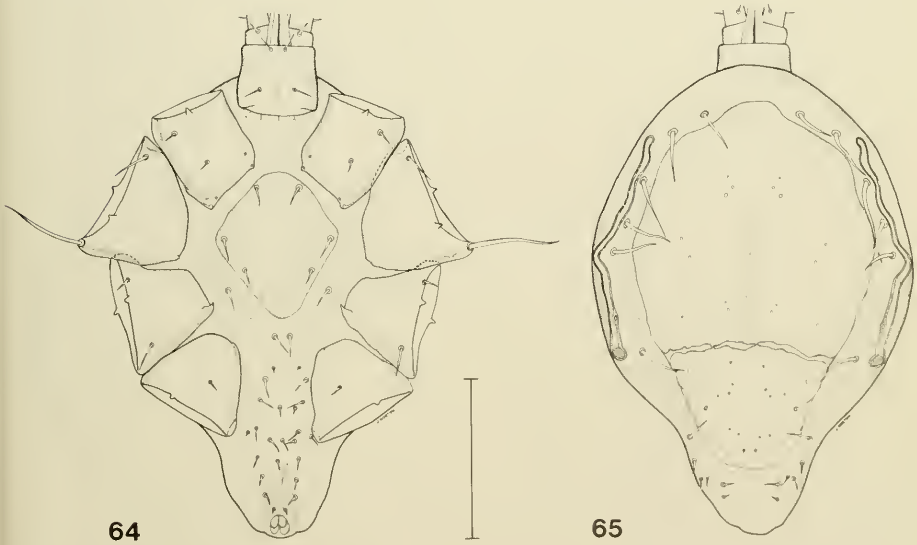

Fig. 64-65. *Periglischrus paravargasi* n. sp., female deutonymph. (64) venter; (65) dorsum, scale = 200 μ.

to dorsal plate; first 2 pairs anterolateral to dorsal plate anterior to peritremes; middle 3 pairs laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Dorsal opisthosoma posterior to dorsal plate with 5 pairs of small setae. *Legs*: Coxa I with small proximal seta and medium-sized distal seta; coxa II with medium-sized anterolateral seta and rather large, long posterolateral seta; coxa II with small, somewhat spinelike anterolateral seta and medium-sized posterolateral seta; coxa IV with small median seta. Most ventral leg setae small, some robust, spinelike. Antero- and posterolateral setae of legs small to medium sized, some more robust, spinelike. One or both distal dorsal setae of trochanters II-IV, femora, patella, and tarsi I-IV rather large, long; most other leg setae small. *Gnathosoma*: Gnathosomal and one hypostomal setae small, slender; other 2 pairs of hypostomal setae absent or inapparent. Palpal setae small, some robust, spinelike; 2 pairs of laterodistal setae of palpal tibia peglike. *Measurements*: Idiosoma length, 537 μ; greatest width, 395 μ. Sternal plate length, 168 μ; greatest width, 144 μ. Sternal setae length, 17-29 μ; genital setae length, 27-28 μ; intercoxa IV setae length (excluding first pair of minute setae), 8-23 μ. Peritreme length, 266 μ. Dorsal plate length, 431 μ; greatest width, 294 μ. Length of legs (base of trochanter to end of tarsus): Leg III, 263 μ; leg IV, 316 μ; length of legs I and II could not be measured because legs were twisted too much.

MALE DEUTONYMPH: (Fig. 66-67). *Venter*: Similar in most characters to female deutonymph with following exceptions: sternal setae, especially first and second, distinctly larger and longer, first pair extending posteriorly almost to level of first pair of pores; intercoxa IV area posterior to genital setae with eight pairs of mostly small setae, including first pair of minute setae and one pair of subterminal adanal setae. *Dorsum*: Similar in most characters to female deutonymph with following exceptions: Dorsal podosomal setae somewhat more robust and dorsal opisthosomal setae absent or inapparent. *Legs*: Similar in most characters to female deutonymph. *Gnathosoma*: Similar in most characters to female deutonymph. *Measurements*: Idiosoma length, 465 μ; greatest width, 336 μ. Sternal plate length, 164 μ; greatest width, 135 μ. Sternal setae length, 22-41 μ; genital setae length, 28-30 μ; intercoxa IV setae length (excluding first pair of minute setae), 9-26 μ. Peritreme length, 271 μ. Dorsal plate length, 433 μ; greatest width, 330 μ. Length of legs (base of trochanter to end of tarsus): Leg III, 304 μ; leg IV, 381 μ; length of legs I and II could not be measured because legs were twisted.

PROTONYMPH: (Fig. 68-69). *Venter*: Sternal plate oval to diamond shaped; three pairs of small setae on lateral margins; two pairs of small circular pores set in from lateral margins; metasternal and genital setae absent. Intercoxa IV area with four pairs of setae plus one pair

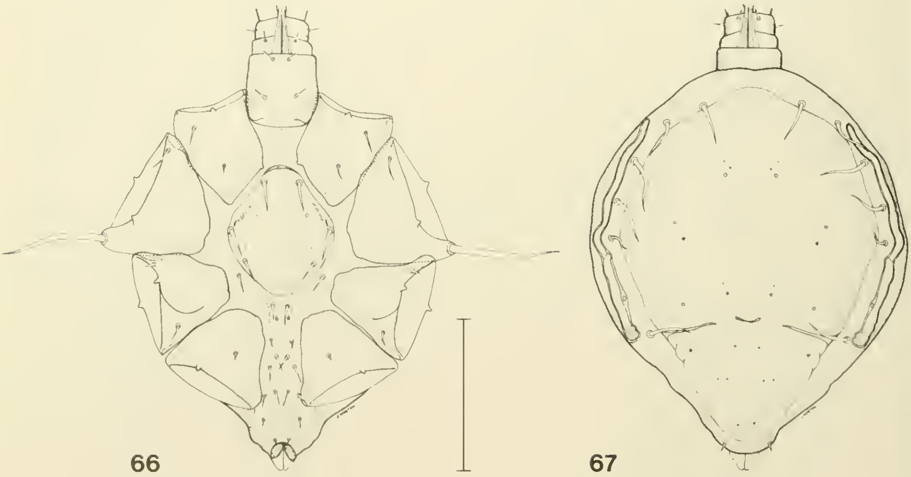

Fig. 66-67. *Periglischrus paravargasi* n. sp., male deutonymph. (66) venter; (67) dorsum, scale = 200 μ.

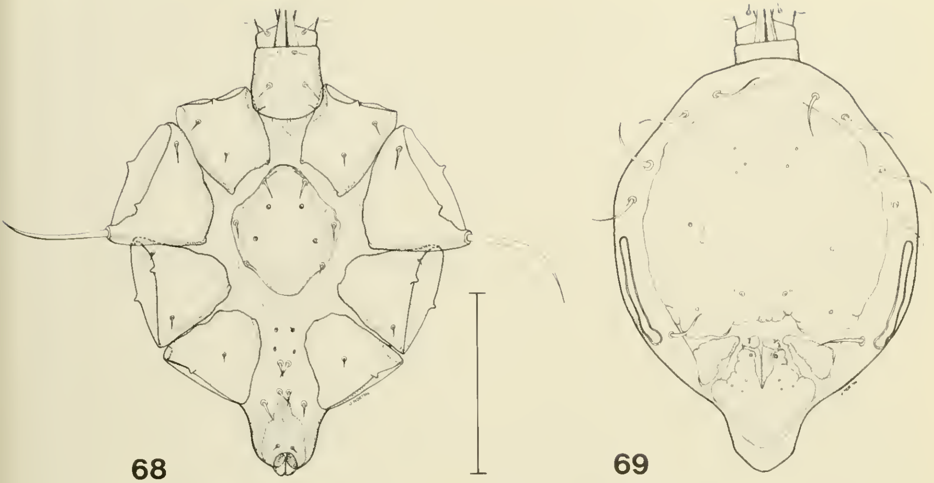

Fig. 68-69. *Periglischrus paravargasi* n. sp., protonymph. (68) venter; (69) dorsum, scale = 200 μ.

of subterminal adanal setae; first pair posterior to sternal plate minute, all others small. *Dorsum*: Peritreme dorsal, short, lying over coxa III. Posterior quarter of dorsal plate superficially divided from anterior portion by narrow transverse band of lightly sclerotized integument; dorsal plate slightly ornamented with small light and dark areas of irregular shapes and small circular pores or setal bases. Dorsal podosoma with five pairs of rather large setae lateral to dorsal plate; first two pairs anterolateral to dorsal plate at level over coxa I; middle two pairs anterior to peritremes and lateral to dorsal plate at level over coxa II; fifth pair posterior to stigmata. *Legs*: Coxa I with both proximal and distal setae small; coxa II with anterolateral seta medium sized, but posterolateral seta rather large; anterolateral seta of coxa III small, spinelike, and posterolateral seta more slender and somewhat longer; median seta of coxa IV small. Ventral leg setae small, some spinelike. Antero- and posterolateral setae of legs small to medium sized, larger setae often slightly recurved. One or two distal dorsal setae of trochanters II-IV; femora, patella, and tibiae I-IV relatively large; most other leg setae small to medium sized, except certain proximal setae of some femora, patella and tibiae minute. *Gnathosoma*: Gnathosomal and one pair of hypostomal setae small, slender; other hypostomal setae absent or inapparent. Palpal setae small, some spinelike; two pairs of laterodistal setae of palpal tibia short, peglike. Mediodistal lobe of papal tibia absent. *Measurements*: Idiosoma length, 422 μ; greatest width, 329 μ. Sternal plate length, 147 μ; greatest width, 121 μ. Sternal setae length, 14-23 μ; intercoxa IV setae (excluding first minute pair) length, 10-19 μ. Peritreme length, 135 μ. Dorsal plate length, 391 μ; greatest width, 263 μ. Dorsal podosomal setae length, 47-67 μ. Length of legs (base of trochanter to end of tarsus): Leg I, 275 μ; leg II, 231 μ; leg III, 235 μ; leg IV, 258 μ.

Type Material: holotype female, allotype male, and one paratype female (SVP-33740) from *Anoura caudifer*, 2 km SW Altamira (620 m), Barinas, Venezuela, 26 December 1967; one paratype male and one paratype deutonymph (SVP-33163), one paratype deutonymph (SVP-33166), four paratype females, one paratype deutonymph and one paratype protonymph (SVP-33361) from *Anoura caudifer*, Altamira (794 m), Barinas, Venezuela, 13 December 1967; the following paratypes from the same host species and locality as SVP-33740 (holotype), 16-18 December 1967: two females and one protonymph (SVP-33694), one deutonymph (SVP-33695), one female and one male (SVP-33696), one male (SVP-33699), two females (SVP-33734), one male (SVP-33735), one male and two protonymphs (SVP-33736), three females (SVP-33746), and five males and one protonymph (SVP-33785); and the following paratypes from the same host species and locality, 1-4 January 1968: one female and one male (SVP-33915), two females and one protonymph (SVP-34008), one female (SVP-34107), two females (SVP-34185), and two females (SVP-34187).

Venezuelan Records (83 females, 47 males, 14 deutonymphs, and 15 protonymphs): of the 57 collections of *P. paravargasi*, 55 were from species of *Anoura* (*A. caudifer*, 47; *Anoura* sp. A, 5; and *A. geoffroyi*, 3). Two were from *Phyllostomus discolor*, and 1 was from *Chironectes minimus*. Collections were made in the following states: Barinas (20), Bolívar (15), Miranda (6), T. F. Amazonas (5), Carabobo (4), Monagas (3), Dto. Federal (2), Falcón (1), and Yaracuy (1). Collections were made during every month except August.

Remarks: As noted in the Remarks section of *P. paracaligus*, these two species are rather closely related phenetically, differing primarily in the form of the female sternal plate. In the male the sternal setae are long, the first pair extending posterior to or slightly beyond the level of the first pair of pores, and the posterolateral setae of coxa II are long (length at least equal to the width of coxa II). *P. paravargasi* is recorded from species of *Anoura*, mostly *A. caudifer*. In host-parasite associations, this species is most similar to *P. vargasi*, which parasitizes species of *Anoura*, primarily *Anoura geoffroyi*.

Periglischrus vargasi Hoffman, 1944
Fig. 14

Periglischrus vargasi Hoffman, 1944a: 91
Periglischrus squamosus Machado-Allison, 1965 a: 279-281.

Description

Female: Idiosomal length, 784 μ; greatest width, 442 μ. Ventral idiosomal setae small to minute (length 5-17 μ), with posterior two pairs longer. Sternal plate irregularly jug shaped (median length, 124 μ; greatest width, 98 μ); widest point at level between first and second sternal setae; posterior margin broadly rounded; anterior projection rather broad, moderately rounded. Dorsal plate oblong-oval (median length, 382 μ; greatest width, 266 μ); posterior quarter not divided or separated from anterior portion of plate; plate ornamented with numerous small irregularly round dark areas, and small pores or setal bases. Six pairs of large (length 41-79 μ) podosomal setae present lateral to dorsal plate. Dorsal opithosoma with six pairs of medium sized to minute setae; first pair just behind level of coxa IV medium in length (69-77 μ), but others small to minute (length 37-57 μ). Dorsal leg setae large to medium in length, except proximal antero- and posterodorsal setae of femur II, patella II, and tibia II small to minute. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV mostly large, recurved. Most ventral leg setae small; however, some antero- and posterolateral setae may be enlarged and serrated.

Male. Median length of idiosoma, 464 μ; greatest width, 303 μ. Holoventral plate broadly pear shaped (median length, 202 μ; greatest width, 175 μ); covering almost entire dorsum between coxae; five pairs of setae of holoventral plate small to medium sized (length 21-38 μ); third pair of sternal setae smallest; first pair of sternal setae largest, extending posteriorly almost to level of first pair of pores. Intercoxa IV area with 8 pairs of setae plus one pair of subterminal adanal setae; first pair minute, all others small (length 11-23 μ). Dorsal plate oval (median length, 415 μ; greatest width, 290 μ); posterior end narrower; posterior quarter superficially divided from anterior portion by narrow transverse band of lightly sclerotized integument. Six pairs of rather large (length, 31-59 μ) podosomal setae present lateral to dorsal plate; first pair anterolateral to dorsal plate anterior to peritremes; middle four pairs equidistant from each other laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Peritreme undulated laterally around and between middle four pairs of podosomal setae; integument of dorsum surrounding dorsal plate with undulating striations, particularly anterolaterally. Coxal setae varying in size from small to quite large; proximal seta of coxa I much smaller than distal seta; anterolateral seta of coxa III and seta of coxa IV small; anterolateral seta of coxa II and posterolateral seta of coxa III medium sized; posterolateral seta of coxa II large, length almost as great as width of coxa II. Ventral leg setae all rather small, some spinelike. Antero- and posterolateral setae of legs small to medium sized, some slightly recurved. Most distal dorsal setae of leg segments medium to large in size, whereas proximal dorsal setae smaller; proximal setae of femur II, patella II, tibia II, and proximal posterodorsal seta of femur III minute.

Venezuelan Records (114 females, 48 males, 19 deutonymphs, and 13 protonymphs): of the 69 collections from Venezuela, 49 were from *Anoura geoffroyi*, 18 from *Anoura* sp. A, and one each from *Sturnira bideus* and *Vampyrops helleri*. Collections were made in the following states, etc.: Bolívar (19), T. F. Amazonas (13), Sucre (12), Monagas (8), Falcón (7), Mérida (3), Dto. Federal (3), Barinas, (2), Miranda (1), and Carabobo (1). Collections were made in every month except January, March, and September, with the majority in May (9), June (13), and July (16).

REMARKS: Of the four species assigned to this subgroup, *P. vargasi* is the most dissimilar in relation to the other three. In addition to the large, long, dorsal podosomal setae; this species may be distinguished from the female of other species by the slender, setaceous, recurved posteroventral setae of the femur, patella, and tibia of leg IV; by the ornamentation of the dorsal plate; and by the irregular shape of the sclerotized part of the sternal plate. In the male of *P. vargasi,* the intercoxa IV area bears nine pairs of setae (rather than seven or eight pairs as in the other three species). This species is recorded primarily from species of *Anoura* in Venezuela.

Subgroup B

The two species of this subgroup (*P. hopkinsi* and *P. herrerai*) may be distinguished by the larger size of the proximal anterodorsal seta of each femur I, patella I, tibia I, and the anterodorsal seta of tibia II and by the distance between the first and second dorsal podosomal setae being equal to or less than the distance between the second and third setae. However, in many phenetic characters, these two species are rather dissimilar. This is in agreement with host-parasite associations: *P. hopkinsi* is recorded primarily from *Lionycteris spurrelli* (family Phyllostomidae, subfamily Glossophaginae) and *P. herrerai* parasitizes *Desmodus rotundus* (subfamily Desmodontinae).

Periglischrus hopkinsi Machado-Allison, 1965a
Fig. 15, 70-73

Periglischrus hopkinsi Machado-Allison, 1965a: 275-276.

DESCRIPTION

FEMALE: (Fig. 15, 70-71). Idiosomal length, 946 μ; greatest width, 805 μ. Ventral idiosomal setae small to minute (length 7-21 μ). Sternal plate roughly rounded (median length, 93 μ; greatest width, 100 μ); anterolateral margins almost straight; apex of anterior projection narrowly truncate (Fig. 15). Dorsal plate oblong-oval (median length, 377 μ; greatest width, 240 μ); posterior quarter superficially divided laterally from anterior portion; plate slightly ornamented with darker areas of irregular shapes and variable sizes, and small pores or setal bases. Six pairs of large (length 59-74 μ) podosomal setae present lateral to dorsal plate; first five

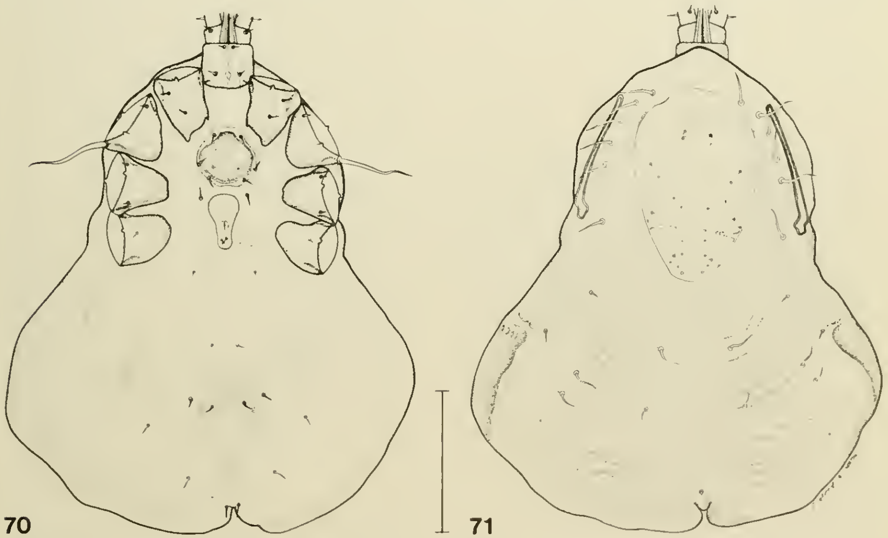

Fig. 70-71. *Periglischrus hopkinsi* Machado-Allison, female. (70) venter; (71) dorsum, scale = 300 μ.

pairs approximately equidistant from each other, lateral and anterolateral to dorsal plate; sixth pair located posterior to level of stigmata. Dorsal opisthosoma with six small to large setae (length 18-57 μ); first two pairs behind level of coxa IV rather small; next three pairs large; sixth pair (located medially) small. Dorsal leg setae large to medium sized, except proximal anterodorsal seta of femur II and proximal posterodorsal seta of femur III minute. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV large, recurved. Most ventral leg setae small; however, some antero- and posteroventral setae enlarged, finely serrate.

Male: (Fig. 72-73). Median length of idiosoma, 426 μ; greatest width, 348 μ. Holoventral plate rather broadly spade shaped (median length, 201 μ; greatest width, 169 μ); covering almost entire venter between coxae; five pairs of setae of holoventral plate slender, medium sized (length 22-40 μ); first pair of sternal setae extends posteriorly to level of first pair of pores. Intercoxa IV area with six pairs of setae plus one pair of subterminal adanal setae; first pair minute (length less than 11 μ); all others slender, small to medium sized (length 18-27 μ). Dorsal plate oval (median length, 395 μ; greatest width, 233 μ); posterior end narrower; posterior quarter divided from anterior portion by narrow transverse band of lightly sclerotized integument. Six pairs of rather large (length 43-56 μ) podosomal setae lateral to dorsal plate; first five pairs approximately equidistant from each other; first pair anterior to peritremes; middle four pairs laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Proximal and distal setae of coxa I, anterolateral seta of coxa II, and posterolateral seta of coxa III slender, medium in length; anterolateral seta of coxa III and seta of coxa IV small; posterolateral seta of coxa II large, much larger than any other coxal setae. Ventral leg setae small to medium sized, some slightly more robust than others. Antero- and posterolateral setae of legs small to medium sized, some slightly recurved. Dorsal leg setae vary from small to large; proximal dorsal setae of trochanters, femora, patella, and tibia larger, whereas distal dorsal setae of all leg segments smaller; proximal anterodorsal seta of femur II and proximal posterodorsal seta of femur III minute.

Venezuelan Records (12 females, 8 males, and 3 deutonymphs): 8 collections of *P. hopkinsi* were made from *Lionycteris spurrelli* and 1 from *Lonchophylla robusta.* Three collections were made in T. F. Amazonas during May, 4 in Bolívar during May and June, and 1 in Barinas during December.

Remarks: Females of *P. hopkinsi* may be distinguished from the other species of the subgroup, *P. herrerai*, by the small irregularly round sternal plate and by the smaller size of

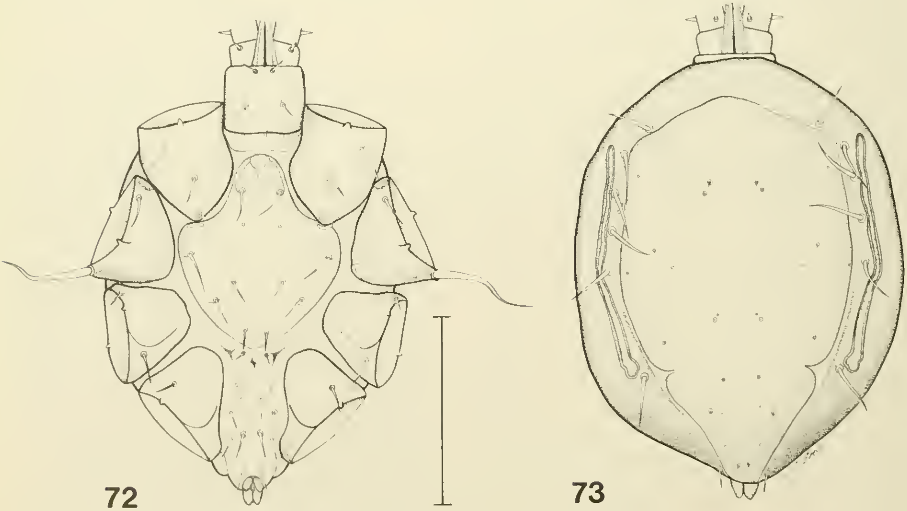

Fig. 72-73. *Periglischrus hopkinsi* Machado-Allison, male. (72) venter; (73) dorsum, scale = 200 μ.

the first dorsal opisthosomal setae just posterior to the level of coxa IV. The male of *P. hopkinsi* is distinctly smaller in size, the ventral setae are noticeably more slender and shorter, and the intercoxa IV area bears seven pairs of setae, the first of which is minute in size. The original description (Machado-Allison, 1965a) of this species was based on a single collection from *Lionycteris spurrelli* in Venezuela. In the present study, eight of the nine collections were from this same host.

Periglischrus herrerai Machado-Allison, 1965
Fig. 16

Periglischrus herrerai Machado-Allison, 1965a: 282-284.
Periglischrus desmodi Furman, 1966: 139-141.

DESCRIPTION

FEMALE: Idiosomal length, 1013 μ; greatest width, 753 μ. Ventral idiosomal setae minute to medium sized; sternal setae and two pairs of posterior opisthosomal setae slender, medium in length (about 23 μ); all other setae small to minute (length about 9 μ). Sternal plate narrowly jug shaped (median length, 155 μ; greatest width, 110 μ); posterior end broadly rounded; anterior projection narrow, elongate, and blunt (Fig. 16). Dorsal plate oblong-oval (median length, 446 μ; greatest width, 292 μ); posterior quarter only superficially divided from anterior portion by slight, rather inapparent suture line; plate ornamented with dark areas of variable size, and small pores or setal bases. Six pairs of large (length 67-99 μ) podosomal setae present lateral to dorsal plate in groups of two, three, and one; (first two pairs close together anterior to peritremes; next three pairs close together laterally between dorsal plate and peritremes; sixth pair located adjacent to stigmata). Dorsal opisthosoma with six pairs of small to medium-sized (length 8-12 μ) setae; first pair just posterior to level of coxa IV medium sized (length about 12 μ); remaining five pairs rather small (length about 8 μ). Dorsal leg setae large to medium in length, except proximal anterodorsal seta of femur II and proximal posterodorsal seta of femur III quite small to minute. Posterolateral setae of legs I-II, IV, and anterolateral seta of legs III-IV rather long, recurved. Most ventral leg setae rather small; however, some posteroventral setae of legs I-II and anteroventral setae of legs III-IV enlarged, finely serrate.

MALE: Median length of idiosoma, 479 μ; greatest width, 412 μ. Holoventral plate broadly spade shaped (median length, 227 μ; greatest width 202 μ), covering most of venter between coxae. Plate between first and second sternal setae lightly sclerotized, appearing to be incised anteromedially to second sternal setae; five pairs of setae of holoventral plate slender, long (47-69 μ); first sternal setae extend posteriorly well beyond level of first pair of pores to or beyond level of second sternal setae. Intercoxa IV area with eight to nine pairs of setae plus one pair of subterminal adanal setae; all setae of intercoxa IV area slender, small to medium in length (17-38 μ); first pair subequal in length to others, not minute as in most other species. Dorsal plate oblong-oval (median length, 442 μ; greatest width, 287 μ); posterior end narrower; posterior quarter divided from anterior portion by narrow transverse band of lightly sclerotized integument. Six pairs of rather large (length 55-76 μ) podosomal setae lateral to dorsal plate; first two pairs close together anterolateral to dorsal plate anterior to peritremes; middle three pairs close together in group between dorsal plate and peritremes; sixth pair posterior to stigmata. Coxal setae generally slender, medium length; posterolateral seta of coxa II rather large, long; anterolateral seta of coxa III and seta of coxa IV smaller than other coxal setae. Most ventral leg setae slender, short to medium in length. Antero- and posterolateral leg setae mostly slender, short to medium in length, with longer setae usually recurved slightly. Proximal anterodorsal seta of femur II and proximal posterodorsal seta of femur III minute; distal setae of trochanters II-IV, femora I-IV, and patella I-IV large, long; all other dorsal leg setae slender, short to medium in length.

VENEZUELAN RECORDS (42 females, 50 males, 23 deutonymphs, and 4 protonymphs): among the 66 collections of *P. herrerai*, 62 were from *Desmodus rotundus*, 2 were from *Sturnira lilium*, 1 was from *Sturnira ludovici*, and 1 was from *Anoura* sp. A. Collections were made in the following states and territories: Trujillo (13), T. F. Amazonas (11), Guárico (8), Falcón (5), Barinas (4), Carabobo (4), Nueva Esparta (4), Sucre (4), Apure (4), Zulia (3), Miranda (2), Guajira (2), Bolívar (1), and Monagas (1). Collections were made in each month except February and May, but the majority were made during the latter half of the year.

REMARKS: Even though *P. herrerai* is recorded primarily from *Desmodus rotundus* (subfamily Desmodontinae), it is phenetically similar to *P. hopkinsi* and the other 4 species of group II in the specific characters noted previously. Its main differentiating character is the possession of large dorsal podosomal setae. The female of this species is easily separated from that of *P. hopkinsi* by the narrow anterior projection of the sternal plate and the larger size of the first pair of dorsal opisthosomal setae just posterior to the level of coxa IV; and in the males by the 9 or 10 pairs of setae of the intercoxa IV area, the first of which is distinctly longer than that in any other species. Machado-Allison (1965a) reported *P. herrerai* only from *Desmodus rotundus*, and in the present study 62 of the 66 collections were from this host. The other 4 collections may represent accidental hosts or contamination of collections.

Group III

The three species comprising this major group (*P. ojastii*, *P. ramirezi*, and *P. iheringi*) are parasitic primarily on three different phyllostomid bat subfamilies: Sturnirinae, Carolliinae, and Stenodermatinae, respectively. However, *P. ojastii* and, particularly, *P. iheringi* are much less host specific than most other species of *Periglischrus* and thus are recorded from a great number of different hosts of several families and subfamilies of bats. This group may be distinguished from group II by the smaller size of the dorsal podosomal setae and from group I by the combination of a number of characters previously noted. There is considerable overall phenetic similarity among these three species: e. g., the form of the female sternal plates, especially between *P. ojastii* and *P. iheringi;* and the dorsal plate and setation, except for the first pair of podosomal setae, which are small to minute and on the anterolateral margins of the dorsal plate in females of *P. ramirezi* and *P. iheringi.*

Periglischrus ojastii Machado-Allison, 1964
Fig. 17

Periglischrus ojastii Machado-Allison, 1964: 197-199.

Periglischrus aitkeni Furman, 1966: 137-139.

Description

Female: Idiosomal length, 1177 μ; greatest width, 780 μ. Ventral podosomal setae small to medium sized (length 13-23 μ); opisthosomal setae small to minute. Sternal plate broadly pear shaped (median length, 153 μ; greatest width, 149 μ); posterior and lateral margins broadly rounded; anterior projection narrowly rounded (Fig. 17). Dorsal plate oblong-oval (median length, 491 μ; greatest width, 321 μ); lateral margins moderately invaginated, forming rather prominent anterolateral shoulders; posterior quarter superficially divided from anterior portion by narrow band of lightly sclerotized integument, plate ornamented with darker areas of variable size and shape, and small pores or setal bases. Six pairs of medium-sized (length 21-49 μ) dorsal podosomal setae present lateral to dorsal plate; first two pairs distinctly closer together than others, sixth pair posterior to stigmata. Dorsal opisthosoma with four pairs of small to minute setae; no seta present just posterior to level of coxa IV. Dorsal leg setae large, except proximal anterodorsal seta of femur II and posterodorsal seta of femur III minute. Posterolateral setae of legs I-II and anterolateral setae of legs III-IV mostly large; posterolateral setae of legs III-IV bladelike, short, expanded, and flattened. Ventral leg setae small to medium sized; however, some anteroventral and posteroventral leg setae may be somewhat enlarged, spinelike.

Male: Median length of idiosoma, 561 μ; greatest width, 399 μ. Holoventral plate spade shaped (median length, 258 μ; greatest width, 212 μ), covering almost entire venter between coxae; five pairs of setae of holoventral plate rather large, robust (length 55-80 μ); first sternal setae extend posteriorly beyond level of second sternal setae. Intercoxa IV area with seven pairs of setae plus one pair of subterminal adanal setae; first pair minute, but all others medium length (30-45 μ) and rather robust. Dorsal plate oblong-oval (median length, 518 μ; greatest width, 307 μ); posterior end distinctly narrowing to form narrow, blunt posterior end; posterior quarter superficially divided from anterior portion by narrow band of lightly sclerotized integument. Six pairs of rather large (length 47-56 μ) podosomal setae present lateral to dorsal plate; first two pairs close together anterior to peritremes; middle three pairs laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Coxal setae medium sized to very large, robust; anterolateral seta of coxa III smallest, with posterolateral seta of coxa II largest (length as great as or greater than width of coxa II). Ventral leg setae small to medium sized, most rather robust and spinelike. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV of medium length and slightly recurved; other antero- and posterolateral setae mostly short, straight. Most distal dorsal setae of trochanters, femora, patella, and tibiae rather large; most other dorsal leg setae small to medium sized, except proximal anterodorsal seta of femur II minute. Spermatophore process of chelicerae short, shaped like shepherd's crook, not long and recurved as in most other species.

VENEZUELAN RECORDS (1,128 females, 567 males, 65 deutonymphs, 66 protonymphs, and 141 undetermined nymphs): *P. ojastii* is parasitic primarily on bats of the genus Sturnira. Of 695 total collections, 488 were from *Sturnira lilium*, 97 from *S. ludovici*, 36 from *S. erythromos*, 22 from *S. tildae*, 12 from *S. bidens*, and 4 from *S. bogotensis*. There were 6 collections from *Artibeus jamaicensis*, 4 from *Desmodus rotundus;* 3 from *Phyllostomus discolor;* 2 each from *Glossophaga soricina, Carollia perspicillata, Uroderma bilobatum; Vampyrops helleri, Artibeus hartii,* and *A. lituratus;* and 1 each from *Noctilio leporinus, N. labialis, Phyllostomus hastatus, Phylloderma stenops, Trachops cirrhosus, Glossophaga longirostris, Anoura geoffroyi, Leptonycteris curasoae, Vampyrops umbratus, Vampyressa bidens, Artibeus cinereus,* and *Artibeus* sp. Collections were made in the following states, etc.: Dto. Federal (95), Trujillo (80), T. F. Amazonas (76), Barinas (74), Miranda (70), Bolívar (65), Sucre (58), Guárico (40), Zulia (29), Mérida (27), Falcón (27), Carabobo (20), Monagas (14), Apure (12), Aragua (11), Monagas (6), Yaracuy (2), Táchira (2), and Nueva Esparta (1). At least 8 collections were made during every month of the year.

REMARKS: The female and male *P. ojastii* resemble *P. iheringi* in many ventral idiosomal characters, particularly the form of sternal and holoventral plates and relative length of setae. However, the two differ significantly in dorsal characters. The first pair of dorsal podosomal setae of females of *P. ojastii* are subequal in length to the other podosomal setae and are on the integument anterolateral to the dorsal plate, whereas in *P. iheringi* and also in *P. ramirezi*, the first pair are small to minute and are on the anterolateral margins of the dorsal plate. In both sexes of *P. ojastii* the distance between the first and second pairs of podosomal setae is distinctly less than the distance between the second and third pairs, whereas in the other two species the distance between the first and second pairs is distinctly greater than that between the second and third. The posteroventral setae of femur IV, patella IV, and tibia IV are straight and bladelike in females of both *P. ojastii* and *P. iheringi*, whereas in those of *P. ramirezi* these setae are slender and recurved.

P. ojastii has been previously reported almost exclusively from species of *Sturnira*. Machado-Allison (1964, 1965a) recorded collections from *S. lilium* and *S. ludovici* in Venezuela, and Furman (1966), who described this species as *P. aitkeni*, reported collections from *S. lilium, S. ludovici*, an unidentified species of *Sturnira*, and *Noctilio leporinus* in Panamá. In the present study 659 of the 695 collections were from species of *Sturnira;* the remaining 36 collections were from various other species of bats (some of which may have been accidental associations or work table contaminations).

Periglischrus ramirezi Machado-Allison and Antequera, 1971
Fig. 18

Periglischrus ramirezi Machado-Allison and Antequera, 1971: 3-6.

DESCRIPTION

FEMALE: Idiosomal length, 1231 μ; greatest width, 762 μ. Ventral idiosomal setae all rather small to medium sized (length 9-30 μ). Sternal plate oval (median length, 160 μ; greatest width, 127 μ); faint, broadly rounded anterior projection present (Fig. 18). Dorsal plate oblong-oval in general shape (median length, 449 μ; greatest width, 310 μ); lateral margins slightly invaginated; posterior quarter superficially divided from anterior portion; ornamented only slightly by shaded areas of irregular shapes and various sizes and small pores or setal bases. First dorsal podosomal seta medium sized (length 25 μ), on anterolateral margin of dorsal plate; next four pairs of podosomal setae larger (length 31-46 μ) laterally between dorsal plate and peritremes; sixth pair adjacent to stigmata. Dorsal opisthosoma with four pairs of small to minute (length 9-17 μ) setae, no seta just posterior to level of coxa IV. Dorsal leg setae large to medium sized, except posterodorsal seta of femur III minute. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV mostly long, recurved. Ventral leg setae small to medium in length.

MALE: Median length of idiosoma, 495 μ; greatest width, 392 μ. Holoventral plate somewhat spade shaped (median length, 243 μ; greatest width, 192 μ), covering almost entire venter between coxae; five pairs of setae of holoventral plate medium sized (length, 45-60 μ); first sternal setae extend posteriorly just beyond first pair of pores. Intercoxa IV area with six pairs of setae plus one pair of subterminal adanal setae; first pair of setae minute (length less than 15 μ), all others medium sized (length 27-38 μ). Dorsal plate oblong-oval (median length, 438 μ; greatest width, 316 μ); posterior end narrower; posterior quarter very superficially divided from anterior portion by faint narrow transverse band of lightly sclerotized integument. Six pairs of moderately large (length, 55-62 μ) podosomal setae present lateral to dorsal plate; first pair anterior to peritremes, set on anterolateral margins of dorsal plate; middle four pairs laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Coxal setae all medium sized, except posterolateral seta of coxa II rather large, long (length approximately equal to width of coxa II). Ventral leg setae small to medium in length, most robust, spinelike; ventral setae of legs III-IV rather robust and apically recurved. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV moderately large, recurved; other antero- and posterolateral setae smaller, straight. Most distal dorsal setae of trochanters, femora, patella, and tibiae large, long, whereas most other leg setae small to medium sized, except proximal posterodorsal seta of femur III minute.

VENEZUELAN RECORDS (44 females, 11 males, and 4 protonymphs): the 12 collections were from *Rhinophylla pumilio* in T. F. Amazonas (10) and Bolívar (2), during February, April, May, June, September, and October. In addition, Machado-Allison and Antequera (1971) reported 9 collections (12 females, 2 males, and 2 protonymphs) from the Smithsonian Venezuelan Project collection of *Rhinophylla pumilio*. These collections were from Bolívar (7) and Apure (2). They also reported a collection of 3 females from *R. pumilio* at Belém, Pará, Brazil in August 1965.

REMARK: *P. ramirezi* is most similar to *P. iheringi*, yet differs in several important characters: The first pair of dorsal podosomal setae of the female are small but not minute as in *P. iheringi*, and the posteroventral setae of femur IV, patella IV, and tibia IV of the female are setaceous and recurved rather than straight and bladelike. The female sternal plate is oval in shape rather than pear shaped, and in the male the sternal setae are shorter and the intercoxa IV area bears seven pairs of setae rather than eight pairs. *P. ramirezi* has been reported only from *Rhinophylla pumilio*, all from Venezuela except the one report from Brazil.

Periglischrus iheringi Oudemans, 1902
Fig. 19

Periglischrus iheringi Oudemans, 1902: 38.
Periglischrus jheringi (sic) Oudemans, 1903: 135.
Periglischrus meridensis Hirst, 1927: 335.
Spinturnix ewingia Wharton, 1938: 139.
Spinturnix artibiensis Radford, 1951: 97.

DESCRIPTION

FEMALE: Idiosomal length, 1,262 μ; greatest width, 854 μ. Ventral podosomal setae small to medium sized (length 13-24 μ); ventral opisthosomal setae small to minute (length 9-23 μ), with posteriormost two pairs longer than others. Sternal plate broadly pear shaped (median length, 153 μ; greatest width, 143 μ; anterior projection short, broad, moderately rounded (Fig. 19). Dorsal plate oblong-oval (median length, 507 μ; greatest width, 323 μ); lateral margins invaginated with prominent anterolateral shoulders and distinct, rounded, anterior projection; posterior quarter of plate superficially divided from anterior portion; plate ornamented with mostly large, darker areas of variable shape and small pores or setal bases. First dorsal podosomal seta quite small (length 12-13 μ), located on anterolateral margins of dorsal plate; next four dorsal podosomal setae moderately large (length 36-57 μ), located laterally between dorsal plate and peritremes; sixth pair posterior and adjacent to stigmata. Dorsal opisthosoma with four pairs of rather small setae (length 18-24 μ); no seta located just posterior to level of coxa IV. Dorsal leg setae large, except anterolateral seta of femur II and posterolateral seta of femur III minute. Most posterolateral setae of legs I-II and anterolateral setae of legs III-IV rather long, recurved; posterolateral setae of leg IV bladelike, straight, flattened, somewhat expanded, and shorter. Ventral leg setae small to medium sized.

MALE: Median length of idiosoma, 659 μ; greatest width, 447 μ. Holoventral plate spade shaped (median length, 288 μ; greatest width, 204 μ); covering most of venter between coxae; five pairs of setae of holoventrol plate quite large (length 59-89 μ); first sternal setae extend posteriorly to or beyond level of second sternal setae. Intercoxa IV area with seven pairs of setae plus one pair of subterminal adanal setae; first pair minute (length less than 12 μ); all others medium in length (27-50 μ) and rather robust. Dorsal plate oblong-oval (median length, 503 μ; greatest width, 338 μ); posterior end narrowing considerably, forming narrow, blunt posterior end; posterior quarter superficially divided from anterior portion by narrow band of lightly sclerotized integument. Six pairs of rather large (length 55-68 μ) podosomal setae present lateral to dorsal plate; first pair anterior to peritremes on anterolateral margins of dorsal plate; second pair on anterolateral margins of dorsal plate at level of anterior end of peritremes, and set relatively close to first pair; middle three pairs laterally between dorsal plate and peritremes; sixth pair posterior to stigmata. Most coxal setae moderately large, rather robust; anterolateral seta of coxa III smallest, with posterolateral seta of coxa II largest. Most ventral leg setae small to medium sized, some rather robust, spinelike. Posterolateral setae of legs I-II, IV, and anterolateral setae of legs III-IV medium sized, slightly recurved; other antero- and posterolateral leg seta smaller, straight. Most distal dorsal setae of trochanters, femora, patella, and tibia quite large, long; all other leg setae small to medium sized.

VENEZUELAN RECORDS: Collections of this species from throughout Venezuela numbered 1,682. Of these, about 525 were mounted and their identification was confirmed. Eighty-one percent of these were on species of *Artibeus*, *Vampyrops*, and *Uroderma*. The remaining 1,150+ collections were examined in alcohol and tentatively determined to be *P. iheringi* on the basis of their association with the above bats.

The 525 verified collections of *P. iheringi* represent 607 females, 459 males, 92 deutonymphs, and 91 protonymphs. There were 340 collections from bats of the genus *Artibeus* (*A. jamaicensis*, 234; *A. lituratus*, 90; *A. hartii*, 8; *A. cinereus*, 6; and *A. fulginosus*, 2), 45 collections from the genus *Vampyrops* (*V. helleri*, 41; *V. aurarius*, 2; and *V. umbratus*, 2), and 40 collections from the genus *Uroderma* (*U. bilobatum*, 39; and *U. magnirostrum*, 1). Other host records were as follows: *Sturnira lilium* (9), *Carollia perspicillata* (8), *Vampyressa* pusilla (8), *Ectophylla macconnelli* (6), *Desmodus rotundus* (5), *Carollia brevicauda* (4), *Sturnira ludovici* (4), *Pteronotus davyi* (3), *Pteronotus parnellii* (3), *Phyllostomus hastatus* (3), *Glossophaga longirostris* (3), Anoura *geoffroyi* (3), *Phyllostomus discolor* (2), *Glossophaga soricina* (2), *Ametrida centurio* (2), *Micronycteris megalotis* (1), *Mimon crenulatum* (1), *Anoura caudifer* (1), *Anoura* sp. (1), *Carollia* sp. (1), *Eumops glaucinus* (1), *Sphaeronycteris toxophyllum* (1), *Chiroderma villosum* (1), *Myotis albescens* (1), *Myotis nigricans* (1), *Sturnira* sp. (1), and *Molossus ater* (1). Verified collections were made from the following states, etc.: Zulia (70), Trujillo (67), Apure (65), T. F. Amazonas (61), Barinas (47), Dto. Federal (38), Falcón (34), Yaracuy (26), Carabobo (25), Miranda (24), Sucre (22), Monagas (20), Guárico (20), Aragua (2), Bolívar (2), Lara (1), and Nueva Esparta (1). Twelve to 85 collections were made during each month of the year.

The 1,150+ tentatively identified collections of *P. iheringi* represent about 3,487 specimens (approximately 1,750 females, 869 males, and 868 deutonymphs and protonymphs together). There were 553 collections from bats of the genus *Artibeus* (*A. lituratus*, 315; *A. jamaicensis*, 147; *A. cinereus*, 88; *A. concolor*, 2; and *A. hartii*, 1), 384 collections from species of *Vampyrops* (*V. helleri*, 279; *V. umbratus*, 73; *V. aurarius*, 32; *V. vittatus*, 5; and *V. saccharus*, 1), and 178 collections from species of Uroderma (*U. bilobatum*, 172; and *U. magnirostrum*, 7). Other host records of tentatively identified *P. iheringi* are as follows: *Vampyressa pusilla* (14), *Vampyressa bidens* (11), *Chiroderma trinitatum* (4), *Vampyrodes caraccioli* (3), *C. salvini* (2), *Noctilio labialis* (2), *Rhynconycteris naso* (1), *Vampyrum spectrum* (1), *Carollia perspicillata* (1), *Sturnila ludovici* (1), and *Ametrida centurio* (1). These 1,150+ collections were from: T.F. Amazonas (182), Apure (177), Yaracuy (127), Zulia (120), Bolívar (108), Barinas (97), Falcón (76), Miranda (71), Sucre (54), Carabobo (51), Dto. Federal (43), Trujillo 14, Monagas (14), Nueva Esparta (11), Guárico (10), Lara (5), and Aragua (4). Twenty-five to 219 collections were made during each month of the year.

REMARKS: *P. iheringi* is the best known and most frequently collected of all species of *Periglischrus*. This frequency of occurrence is no doubt correlated with the low degree of host specificity demonstrated by this species. It is easily recognized and may be distinguished from all other species by the following characters in females: the first pair of dorsal podosomal setae are minute and on the anterolateral margin of the dorsal plate; the posteroventral setae of femur IV, patella IV, and tibia IV are straight and bladelike; and the sternal plate is broadly pear shaped. In the male, the sternal setae are rather large and long and the first pair extends to or beyond the level of the second pair of setae.

P. iheringi is recorded from the families Emballonuridae, Noctilionidae, Mormoopidae, almost all subfamilies of Phyllostomidae, and Vespertilionidae. However, most collections are from Phyllostomid bats, particularly the subfamily Stenodermatinae; i.e., of the 1,682 collections in the present study, 1,578 were from bats of the subfamily Stenodermatinae. By far, the majority of collections are from species of the genera *Artibeus*, *Uroderma*, and *Vampyrops*. These data are in agreement with the host-parasite relationships reported by previous workers dealing with this species throughout the Neotropical region.

Group IV
Periglischrus natali Furman, 1966
Fig. 20

Periglischrus natali Furman, 1966: 128-130.
Mesoperiglischrus nyctiellinus Dusbabek, 1968: 12-15.

Description

Female: Idiosomal length, 666 μ; greatest width, 483 μ. All ventral idiosomal setae small to minute (length 10-13 μ). Sternal plate broadly pear shaped (median length, 120 μ; greatest width, 108 μ); greatest width just anterior to second sternal setae; narrowing toward narrowly rounded anterior end (Fig. 20). Peritremes laterodorsal in position, between coxa IV and coxa I; of normal width posteriorly near stigmata and at anterior end, but narrow and threadlike between. Dorsal plate oblong-oval (median length, 328 μ; greatest width, 243 μ); posterior quarter superficially divided from anterior portion. Six pairs of medium-sized (length 14-25 μ) podosomal setae lateral to dorsal plate; first two pairs flattened, bladelike; first pair located near anterior end of plate, with distance between first and second pairs much greater than that between second and third; middle four pairs laterally between dorsal plate and peritremes; distance between third and fourth much greater than that between fourth and fifth; sixth pair located posterior to stigmata. Dorsal opisthosoma with six pairs of small to minute setae (length 8 μ or less). Most leg setae small to medium in length, except distal posterodorsal seta of each femur I-II and patella I-II distinctly longer than other leg setae, and proximal anterodorsal seta of each femur II, patella II, and proximal posterodorsal seta of each femora III-IV minute. Posterolateral setae of legs I-II, IV, and anterolateral setae of leg III of medium length, recurved. Most ventral leg setae small to minute.

Male: Idiosomal length, 314 μ; greatest width, 237 μ. Holoventral plate covers entire venter between coxae (median length, 159 μ; greatest width, 123 μ); five pairs of setae of holoventral plate of medium length (length 24-38 μ); setae distinctly shorter than distance to adjacent posterior setal bases; first sternal setae extend posteriorly to or just beyond first pair of pores. Intercoxae IV area posterior to holoventral plate with seven slender, small to medium length setae (length 20+ μ). Laterodorsal peritremes of normal width over coxa III but becoming narrow and threadlike (appearing to be absent) anterior to level of coxa III. Dorsal plate oblong-oval (median length, 280 μ; greatest width, 221 μ), similar to that of female. Six pairs of podosomal setae rather small, in approximately same relative positions as in females. Leg setae similar to those of females.

Venezuelan Records (3 females, 1 male, and 1 deutonymph): the four collections of *P. natali* were from *Natalus tumidirostris*. One collection was made in Bolivar during April and the other three in Falcón during July.

Remarks: *P. natali* is relegated to a separate, monotypic group because of its dissimilarity to all other species of *Periglischrus*. However, it is sufficiently similar to other species of *Periglischrus* to be included in the genus. Dusbabek (1968) described this species as *Mesoperiglischrus nyctiellinus*, but we have determined it to be synonymous with *P. natali* Furman, 1966, and have further determined that it should not be placed in a separate genus. Both sexes of this species can be easily distinguished by the narrow, threadlike section of the peritreme from coxa III to near coxa I. Also, the dorsal podosomal setae are rather small and the first two pairs are flattened and bladelike in the female and minute in the male.

P. natali is known only from bats of the genus *Natalus* (family Natalidae). Furman (1966) reported collections of this species from *Natalus stramineus* and *N. tumidirostris*, and Dusbabek (1968) reported collections from *N. lepidus*. Our four collections were from *N. tumidirostris*.

Inserti Sedis

The following three collections containing one adult female and/or male specimen each represent two or three different forms which could not be placed with the other species of *Periglischrus* treated herein. These may represent two or three new taxa. However, in the absence of additional specimens of each, we felt it inadvisable to describe them as new species.

One female, 1 male, and 1 protonymph (SVP-17517) from *Macrophyllum macrophyllum*, 108 km SSE Esmeralda (140 m), Rio Mavaca, T.F. Amazonas, Venezuela, April 5, 1967. One female (SVP-41655) and 1 male (SVP-41660) from *Macrophyllum macrophyllum*, 56 km WNW Econtrados (76 m), El Rosario, Zulia, Venezuela, March 10, 1968.

An additional deutonymph and 10 protonymphs (10 collections) could not be correctly identified either on morphological characters or by association with identifiable adults. These 10 collections were from the following hosts: *Saccopteryx bilineata* (1), *Lonchophylla robusta* (1), *Anoura geoffroyi* (1), *Anoura* sp. (1), *Carollia perspicillata* (1), *Sturnira lilium* (4), and *Molossus ater* (1).

Genus *Spinturnix* von Heyden

Spinturnix von Heyden, 1826, Isis (Oken), 18(6): 612.

Type Species: *Pteroptus myoti* Kolenati, 1856, designated by Opinion 128 of the International Commission on Zoological Nomenclature (1936).

Description

Dorsal plate single, with several pairs of pores on surface. Three to five pairs of propodosomal setae present lateral to dorsal plate. Peritremes short, lying dorsal to coxae III; anterior ends bending ventrad, usually reaching ventral surface between coxae II and III. One pair of metapodosomal setae present near stigmata. Opisthosoma with few to many setae. Tritosternum usually small, but sometimes moderately large or totally reduced. Sternal plate of female with three pairs of setae and two pairs of pores. Holoventral plate of male with three to five pairs of setae and two pairs of pores. Endopodal and metasternal plates usually represented by small remnants. One pair of short metasternal setae usually present. Genital plate of female small, usually delicately sclerotized with one pair of small setae on or near posterior apex. Integument between genital and anal plates with few to many short setae. Anal plate small, ventroterminal, with one pair of adanal setae and one postanal seta. Legs stout, with mostly short ventral setae, except for lateroventral setae which may be mostly long; dorsal setae mostly long to very long; claws and caruncles large and strong but not unusually enlarged.

Remarks: Rudnick (1960) divided the species of the genus *Spinturnix* into three groups on the basis of leg setation. The first group, composed of *S. americanus* and *S. banksi*, can be distinguished by the following characters: most ventral leg setae short, proximal pair of dorsal setae of femora I and II (anterodorsal and posterodorsal) minute, and proximal posterodorsal seta of each femora III and IV minute. The second group, consisting of *S. bakeri*, *S. mexicanus*, *S. orri*, and *S. surinamensis*, is characterized as follows: posteroventral setae of leg II and anteroventral setae of leg III mostly long; proximal anterodorsal seta of each femur I and II long, but proximal posterodorsal seta of each femur I and II minute; and proximal posterodorsal seta of each femur III and IV long. The last group, which includes only *S. subacuminatus* from the New World, may be distinguished as follows: most lateroventral leg setae long; proximal anterodorsal seta of each femur I and II long, with proximal posterodorsal seta of each femur I and II long or short but never minute; and proximal posterodorsal seta of each femur III and IV long.

The genus *Spinturnix* is cosmopolitan in distribution, with the majority of known species occurring on Old World bats of the superfamily Vespertilionoidae. There are currently seven species described from the New World, primarily from tropical and subtropical areas. Of these seven species, four are recorded from Venezuela: *S. americanus*, *S. bakeri*, *S. surinamensis*, and *S. subacuminatus*. In Venezuela, these four species are restricted to bats of the family Vespertilionidae, subfamily Vespertilioninae. *S. americanus* is recorded from species of *Myotis*; *S. bakeri* and *S. surinamensis* occur on species of the genus *Eptesicus*; and *S. subacuminatus* is found only on bats of the genus *Rhogeessa*.

Key to New World Species of *Spinturnix*

1. Lateroventral setae of legs mostly short; pair of proximal dorsal setae of femora I-II minute; proximal posterodorsal seta of each femur III-IV minute. (Group 1) 2

Lateroventral setae of legs mostly long or, at least, posteroventral setae of leg II and anteroventral setae of leg III mostly long; pair of proximal dorsal setae of femora I-II long, or only one of each pair minute; proximal posterodorsal seta of each femur III-IV long 3

2(1). About 32-36 (16-18 pairs) dorsal opisthosomal setae in female; about 8-10 (4-5 pairs) dorsal opisthosomal setae in male: from *Myotis grisescens* .... *S. banksi* Rudnick, 1960

With 25 or fewer (13 or fewer pairs) dorsal opisthosomal setae in female; 4 (2 pairs) long dorsal opisthosomal setae in male; with or without long posterolateral setae on tibiae III-IV; from *Myotis* spp. and *Natalus* spp. .... *S. americanus* (Banks, 1902) (p. 62)

3(1). Pair of proximal dorsal setae of femora I-II long, or anterior seta of pair long and posterior seta long to short, but not minute; from *Rhogeessa* spp. (Group III) .... *S. subacuminatus* Furman, 1966 (p. 65)

Pair of proximal dorsal setae of femora I-II with 1 seta long and 1 minute. (Group II) 4

4(3). Four (2 pairs) dorsal opisthosomal setae in male and female; from *Eptesicus fuscus* and *E. montosus* .... *S. bakeri* Rudnick, 1960 (p. 63)

More than 4 (2 pairs) dorsal opisthosomal setae in female; more or less than 4 (2 pairs) dorsal opisthosomal setae in male 5

5(4). About 8 or 9 (4+ pairs) dorsal opisthosomal setae in female; dorsal propodosomal setae rather small; sternal plate with anterior end acute, and posterior margin convex or straight; genital plate small, rather short; one pair of dorsal opisthosomal setae in male; from *Antrozous* spp. .... *S. orri* Rudnick, 1960

About 14-18 (7-9 pairs) dorsal opisthosomal setae in female; dorsal propodosomal setae larger; sternal plate with anterior end broadly rounded, and posterior margin invaginated; genital plate long with parallel sides; 2 or 8 (1 or 4 pairs) dorsal opisthosomal setae in male 6

6(5). Dorsal plate of female with anterior, narrowly rounded apex, and distinct lateral invaginations just behind apex; genital setae on unsclerotized integument posterolateral to margins of broad, inverted-arrow-shaped genital plate; male with 2 (1 pair) dorsal opisthosomal setae; intercoxa IV area of male with 4 pairs of small setae; from several species of *Eptesicus* .... *S. surinamensis* Dusbabek and Lukoschus, 1971 (p. 64)

Dorsal plate of female with anterior end broadly rounded and lacking lateral invaginations; genital setae on posterolateral margins of narrow, parallel sided genital plate; male with 8 (4 pairs) dorsal opisthosomal setae; intercoxa IV area of male with 8 pairs of small setae; from *Pizonyx vivesi* .... *S. mexicanus* Rudnick, 1960

Spinturnix americanus (Banks, 1902)

Pteroptus americanus Banks, 1902: 173.
Spinturnix americanus Banks, 1915: 72.
Spinturnix carloshoffmanni Hoffmann, 1944b: 185.

DESCRIPTION

FEMALE: Idiosomal length, 931 μ; greatest width, 732 μ. Ventral idiosomal setae small to medium sized (length 15-33 μ); first three sternal setae on lateral margins of plate; fourth pair posterior and slightly lateral to third pair; genital setae just off posterolateral margins of small genital plate; ventral idiosoma between and posterior to coxae IV with eight pairs of setae; anal plate with pair of adanal setae and single postanal seta. Sternal plate arrow shaped (median length, 198 μ; greatest width, 173 μ); anterior end bluntly pointed; posterior end slightly invaginated between third sternal setae. Dorsal plate broadly oval to somewhat diamond shaped (median length, 680 μ; greatest width, 534 μ); anterior end much more broadly rounded than posterior end; greatest width at level between coxae II and III. Six pairs of moderately large (length 66-122 μ) dorsal podosomal setae surround dorsal plate laterally and anteriorly; first pair close together anterior to plate; second, third, and fourth pairs anterolateral to plate; fifth pair lateral at level of greatest width of plate; sixth pair posterior to stigmata. Dorsal and terminal opisthosoma with nine plus pairs of moderately long (length 68-147 μ), rather robust setae (more terminally located setae larger). All coxal setae small to medium sized; posterolateral seta of coxa II not unusually larger than other coxal setae. Proximal anterodorsal and posterodorsal setae of femora I-II, and proximal posterodorsal seta of each femur III-IV minute; all other dorsal, anterolateral, and posterolateral setae of legs I-IV rather large or at least of medium length; all ventral leg setae small to medium sized.

MALE: Median length of idiosoma, 799 μ; greatest width, 676 μ. Holoventral plate broadly spade shaped (median length, 337 μ; greatest width, 258 μ); moderately narrow and elongate anterior projection bears genital orifice apically; posterior end abruptly narrowing to blunt point. Ventral idiosomal setae mostly small (length 22-32 μ); holoventral plate with first three pairs of sternal setae on or near lateral margins; fourth pair of sternal setae near posterolateral margins of plate, directly posterior to third pair of setae; genital setae close together at posterior end of holoventral plate. Intercoxa IV area with six pairs of setae; anal plate bears pair of adanal setae and single postanal seta. Dorsal plate oval to diamond shaped as in female (median length, 659 μ; greatest width, 530 μ). Six pairs of rather large (length 96-136 μ) podosomal setae; first four pairs equidistant from each other, anterolateral to dorsal plate; first pair at anterior end of plate; fifth pair lateral to plate at point of greatest width; sixth pair posterior to stigmata. Dorsal opisthosoma posterior to dorsal plate with two pairs of moderately large (length 108 μ) setae. Proximal anterodorsal and posterodorsal seta of each femur I-II, and proximal posterodorsal seta of each femur I-II minute; all other dorsal, anterolateral, and posterolateral setae of legs I-IV rather large or at least of medium length; all ventral leg setae small to medium sized.

Venezuelan Records (145 females, 182 males, 11 deutonymphs, 1 protonymph, and 42 undetermined nymphs): Of the 137 collections of *S. americanus*, 135 were from bats of the genus *Myotis* (*M. nigricans*, 77; *M. albescens*, 33; and *M. keaysi*, 25). A single female was collected from *Eumops glaucinus*, and 1 collection (1 female and 1 male) was recorded from *Saccopteryx canescens*. Collections were made in Carabobo (71), Aragua (24), T.F. Amazonas (23), Apure (7), Miranda (5), Monagas (3), Yaracuy (2), Bolívar (1), and Guárico (1). From 1 to 74 collections were made in each of nine months; no collections were recorded during May, October, and December.

Remarks: *S. americanus* is the only representative of Rudnick's (1960) first group collected in Venezuela. This species may be recognized by the short lateroventral setae of the legs (both proximal anterodorsal and posterodorsal setae of femora I and II are minute and the proximal posterodorsal seta of each femur III and IV is minute) and the dorsal opisthosoma bearing 10-25 setae in the female but only 4 (2 pairs) in the male. Furman (1966) considered *S. carloshoffmanni* Hoffman, 1944 to be a synonym of *S. americanus*. He found considerable variation in characters previously used to differentiate the two species (i.e., the presence or absence of a long, posterolateral seta on tibia III and IV and the number of dorsal, subterminal opisthosomal setae). In Panamá, Furman (1966) observed populations of two variants occurring on the same host species, and in one collection both were found on the same host specimen. In the present study, we have found considerable variation and, thus, have chosen to recognize this synonym as valid. *S. americanus* is known from various species of *Myotis* throughout the Nearctic and Neotropical regions.

Spinturnix bakeri Rudnick, 1960

Spinturnix bakeri Rudnick, 1960: 226-228.

Description

Female: Idiosomal length, 981 μ; greatest width, 709 μ. Ventral idiosomal setae small to medium sized (length 10-28 μ); first three sternal setae on lateral margins of sternal plate; fourth pair of sternal setae directly posterior to third pair; genital setae on posterolateral margins of small genital plate; ventral idiosoma between and posterior to coxae IV with six pairs of setae; anal plate with pair of adanal setae and single postanal seta. Sternal plate somewhat arrow shaped (median length, 158 μ; greatest width, 187 μ); posterior end straight to slightly invaginated between third sternal setae; greatest width at level of second sternal setae. Dorsal plate undivided, generally diamond shaped (median length, 705 μ; greatest width, 511 μ); greatest width at level between coxae II and III; both anterior and posterior ends narrowing considerably. Six pairs of medium sized (length 59-27 μ) dorsal podosomal setae anterior and lateral to dorsal plate; first pair close together anterior to dorsal plate; second, third, and fourth pair lateral at level of greatest width of plate; sixth pair posterior to stigmata. Dorsal opisthosoma with two pairs of medium sized setae (length 46-32 μ). All coxal setae, except posterolateral seta of coxa II, rather small, posterolateral seta of coxa II quite large. Proximal posterodorsal seta of each femur I and femur II minute; all other dorsal seta, anterolateral setae, posterolateral setae, posteroventral setae of legs I-II, and anteroventral setae of leg II-IV rather large or at least of medium length; other ventral leg setae small and rather slender.

Male: Median length of idiosoma, 905 μ; greatest width, 705 μ. Holoventral plate narrowly spade shaped (median length, 327 μ; greatest width, 537 μ); narrow elongate anterior projection bearing genital orifice apically; posterior end narrowing to blunt point. Ventral idiosomal setae mostly small (length 16-33 μ); holoventral plate with first three pairs of sternal setae on or near lateral margins; fourth pair of sternal setae posterior to third pair at level of posterior end of plate; genital setae close together at posterior end of plate directly between fourth sternal setae. Intercoxa IV area with five pairs of setae; anal plate bearing pair of adanal setae and single postanal seta. Dorsal plate diamond shaped as in female (median length, 736 μ; greatest width, 537 μ). Six pairs of rather large (length 83-117 μ) dorsal podosomal setae located anterior and lateral to dorsal plate margins; first pair close together anterior to dorsal plate; second, third, and fourth pairs form group anterolateral to plate; fifth pair lateral to place of greatest width of plate; sixth pair posterior to stigmata. Dorsal opisthosoma posterior to dorsal plate with two pairs of rather large setae (length 104-119 μ). Proximal posterodorsal seta of each femur I and femur II minute; all other dorsal setae, anterolateral setae, posterolateral setae, posteroventral setae of legs I-II, and anteroventral setae of legs III-IV rather large or at least of medium length; other ventral leg setae slender, small to medium in length.

Venezuelan Records (25 females, 23 males, and 1 nymph): Twenty collections of this spinturnicid mite were made in Venezuela. Eighteen of them were from *Eptesicus montosus*, in Dto. Federal (16) and Carabobo (2); a single collection (1 female) was from *Myotis keaysi* in Miranda; and 1 collection of 2 females and 1 male was from *Eptesicus fuscus* in Dto. Federal. Collections were made in the months of July (10), August (7), November (2), and December (1).

Remarks: *S. bakeri* belongs to Rudnick's (1960) second group of *Spinturnix* mites. It may be differentiated from other species of the genus in Venezuela by the following characters: most lateroventral leg setae are long, particularly the posteroventral setae of leg II and the anteroventral setae of leg III; the proximal anterodorsal seta of each femur I and II is long, but the posterodorsal seta is minute; the proximal posterodorsal seta of femur II and IV is long; and the dorsal opisthosoma, posterior to the dorsal plate in both females and males, bears two pairs of setae (those of the female are smaller than those of the male). The latter of these characters differentiates *S. bakeri* from *S. orri*, *S. mexicanus*, and *S. surinamensis*.

S. bakeri has been recorded primarily from *Eptesicus fuscus* throughout North America (Rudnick, 1960). The above Venezuelan records, most of them from *Eptesicus montosus*, are the first reported from the Neotropical region.

Spinturnix surinamensis Dusbabek and Lukoschus, 1971

Spinturnix surinamensis Dusbabek and Lukoschus, 1971: 150-154.

Description

Female: Median length of idiosoma, 1,375 μ; greatest width, 916 μ. Anterior end of sternal plate oval in shape, anterior end broadly rounded, but posterior end truncate (straight) between third sternal setae (median length, 169 μ; greatest width, 161 μ). All ventral idiosomal setae rather small (length 11-32 μ); first three pairs of sternal setae on lateral margins of sternal plate; fourth pair of sternal setae posterolateral to third pair; genital setae on integument lateral to posterior end of genital plate; ventral idiosoma posterior to genital plate bearing from seven to nine pairs of setae plus pair of adanal setae and single postanal seta on anal plate. Dorsal plate generally oval to diamond shaped (median length, 738 μ; greatest width, 508 μ); anterior end narrowly rounded with invaginations anterolaterally; greatest width at level between coxae II and III. Six pairs of medium-sized to large (length 62-119 μ) dorsal podosomal setae laterally adjacent to dorsal plate; first pair close together at anterior end of plate; second, third, and fourth pairs form group anterolateral to plate; fifth pair lateral to widest point of dorsal plate; sixth pair posterior to stigmata. Dorsal opisthosoma with seven to nine pairs of medium to rather large setae (length 28-117 μ). Coxal setae, except posterolateral seta of coxa II, small to medium sized; posterolateral seta of coxa II quite large, long; proximal posterodorsal seta of each femur I-II minute; all other dorsal setae, antero- and posterolateral setae, posteroventral setae of legs I-II, and anteroventral setae of legs III-IV quite large; other ventral leg setae small to medium sized.

Male: Median length of idiosoma, 978 μ; greatest width, 757 μ. Holoventral plate narrowly elongate, spade shaped (median length, 383 μ; greatest width, 217 μ). Ventral idiosomal setae slender and small (length 20-38 μ); first three sternal setae on or near lateral margins of holoventral plate; fourth sternal setae lateral to posterior end of plate; genital setae close together at posterior end of holoventral plate. Intercoxa IV area with four pairs of setae; anal plate with pair of adanal setae and single postanal seta. Dorsal plate oval to diamond shaped (median length, 799 μ; greatest width, 543 μ); posterior end narrower with greatest width at level between coxae II and III. Six pairs of rather large (length 86-128 μ) podosomal setae lateral and anterior to dorsal plate; first pair close together anterior to plate; second, third, and fourth pairs anterolateral to plate; sixth pair posterior to stigmata. Dorsal opisthosoma with one pair of rather large (length 120-124 μ) setae. Coxal setae, except posterolateral seta of coxa II, small to medium sized; posterolateral seta of coxa II quite large. Leg setation identical to that of female; proximal posterodorsal seta of each femur I and II minute.

VENEZUELAN RECORDS (7 females, 8 males, and 2 deutonymphs): This species is restricted to bats of the genus *Eptesicus*. The nine Venezuelan collections were from *E. brasiliensis* (7) and *E. andinus* (2). Collections were made in T.F. Amazonas (5), Barinas (2), and Monagas (2) during the months of April, June, July, and December.

REMARKS: *S. surinamensis* is the only other Venezuelan species of the second group of *Spinturnix*. The species is quite similar in general phenetic characters to *S. bakeri*. However, it can be easily distinguished from *S. bakeri* by the number of dorsal opisthosomal setae: i.e., females of *S. surinamensis* have seven to nine pairs of dorsal opisthosomal setae and the males four pairs, whereas both males and females of *S. bakeri* bear two pairs. Phenetically, *S. surinamensis* is intermediate between *S. orri* and *S. mexicanus*, neither of which have been reported from Venezuela. *S. surinamensis* differs from *S. orri* in the greater number of dorsal opisthosomal setae (seven to nine pairs rather than four plus pairs) in the females; in the larger size of the dorsal podosomal setae, especially the anteriormost pairs in both sexes; and in the shape of the female sternal plate (wider and more broadly rounded anterior end). *S. surinamensis* is more similar to *S. mexicanus* than to any other species of this group. However, it may be differentiated from the latter by the following characters: the dorsal plate of the female has an anterior, narrowly rounded apex with distinct anterolateral invaginations; the genital setae are off the plate near the posterolateral margins; and in the male the dorsal opisthosoma bears one pair of setae and the intercoxa IV area bears four pairs of setae.

This species, originally described from Surinam (Dusbabek and Lukoschus, 1971), has been recorded from three species of *Eptesicus* (*E. melanopterus, E. brasiliensis,* and *E. andinus*).

Spinturnix subacuminatus Furman, 1966

Spinturnix subacuminatus Furman, 1966: 151-152.

DESCRIPTION

FEMALE: Median length of idiosoma, 1,108 μ; greatest width, 810 μ. Sternal plate generally arrow shaped (median length, 182 μ; greatest width, 140 μ); anterior end narrow, acute; posterior end truncate (straight) between third sternal setae. Ventral idiosomal setae small (length 15-38 μ); first 3 sternal setae on or off margins of sternal plate; however, setae bases always joined to plate; fourth sternal setae posterolateral to third setae; genital setae on or off posterolateral margins of small, short, genital plate. Ventral idiosoma posterior to genital plate with 5-7 pairs of setae; anal plate bears pair of adanal setae and single postanal seta. Dorsal plate oval to elongate, diamond shaped (median length, 726 μ; greatest width, 434 μ); both anterior and posterior ends moderately rounded; greatest width at level between coxae II and III. Six pairs of medium-sized (length 46-64 μ) podosomal setae lateral to dorsal plate; first 4 pairs equidistant from each other anterolateral to plate; fifth pair lateral to point of greatest width of plate; sixth pair posterior to stigmata. Dorsal and terminal opisthosoma posterior to sixth podosomal seta with 15-18 pairs of medium sized to large (length 42-123 μ) setae. Coxal setae, except posterolateral seta of coxa II, small to medium sized; posterolateral seta of coxa II rather large. No minute dorsal setae on femora I-IV; however, proximal posterodorsal seta of each femur I and II smaller than most other leg setae; most dorsal leg setae, antero- and posterolateral leg setae, posteroventral setae of legs I-II and anteroventral setae of legs III-IV moderately to quite large; other ventral leg setae small to medium sized.

MALE: Median length of idiosoma, 768 μ; greatest width, 656 μ. Holoventral plate somewhat spade shaped (median length, 271 μ; greatest width, 240 μ). Ventral idiosomal setae generally slender, small (length 16-37 μ); first three pairs of sternal setae on or near lateral margins of holoventral plate; fourth sternal setae posterolateral to end of holoventral plate; genital setae close together between fourth sternal setae and just posterior to holoventral plate. Intercoxa IV area with four pairs of setae; anal plate with pair of adanal setae and single postanal seta. Dorsal plate oval to elongate, diamond shaped (median length, 658 μ; greatest width, 463 μ); anterior and posterior ends moderately rounded; greatest width at level between coxae II and III. Six medium-sized (length 48-73 μ) podosomal setae anterior and lateral to dorsal plate; first four pairs equidistant from each other anterolateral to plate; fifth pair lateral to point of greatest width of dorsal plate; sixth setae posterior to stigmata. Dorsal opisthosoma with only one pair of moderately large (length 74-79 μ) setae. Coxal and leg setae as in female; no minute dorsal setae proximally on femora I-IV; however, proximal posterodorsal seta of each femur I-II smaller than most other dorsal leg setae.

VENEZUELAN RECORDS (97 females, 100 males, 67 deutonymphs, and 19 protonymphs): All 93 collections of *S. subacuminatus* were from bats of the genus *Rhogeessa*. There were 80 collections from *R. minutilla*, 7 from *R. tumida*, and 6 from *Rhogeessa* sp. Most (75) of the Venezuelan collections were made in Lara during the period of July 14-18, 1968. Collections were also made in Zulia (8), Miranda (2), Falcón (3), Guajira (1), Monagas (1), Nueva Esparta (1), Apure (1), and Yaracuy (1). In addition to the numerous collections made during July, others were made during January, March, June, October, November, and December.

REMARKS: *S. subacuminatus* is the only species of Rudnick's (1960) third group found in Venezuela. This species may be distinguished from all other species of *Spinturnix* by the larger size of all dorsal leg setae (the proximal posterodorsal seta of each femur I and II, shorter than other dorsal leg setae but never minute as in other species) and the dorsal and terminal opisthosoma posterior to the stigma bearing 14-17 pairs of setae in females but only 1 pair in males. *S. subacuminatus* has been recorded from several species of the genus *Rhogeessa* in Panama (Furman, 1966) as well as in Venezuela.

Inserti Sedis

Two males (SVP-00331) from *Carollia brevicauda*, 4 km NNW Caracas (1,550 m), Los Venados, Dto. Federal, Venezuela, July 19, 1965.

Appendix 1. Frequency of occurrence of spinturnicid mites on species of bats in Venezuela. (Asterisk denotes the species of mite most often collected from the host species.)

	Host Data			Parasite Data	
	Total Collected	Number Parasitized	Percent Parasitized	Number Collected	Percent of Total on Host
FAMILY NOCTILIONIDAE					
Noctilia labialis	535	2	0.4		
Periglischrus iheringi				3	100
Noctilio leporinus	87	1	1.1		
Periglischrus ojastii				2	100
FAMILY EMBALLONURIDAE					
Rhynchonycteris naso	160	1	0.6		
Periglischrus iheringi				4	100
Saccopteryx bilineata	420	2	0.5		
Periglischrus sp.				1	50
Periglischrus torrealbai				1	50
Saccopteryx canescens	23	1	4.3		
Spinturnix americanus				2	100
SUPERFAMILY PHYLLOSTOMOIDEA FAMILY MORMOOPIDAE					
Mormoops megalophylla	88	9	10.2		
**Cameronieta strandtmanni*				51	100
Pteronotus davyi	222	31	14.0		
**Cameronieta elongatus*				84	96.6
Periglischrus iheringi				3	3.4
Pteronotus parnellii	505	46	9.1		
**Cameronieta elongatus*				216	95.6
Cameronieta thomasi				3	1.3
Periglischrus acutisternus				1	0.4
Periglischrus gameroi				1	0.4
Periglischrus caligus				2	0.9
Periglischrus iheringi				3	1.3

Appendix I (continued)

Pteronotus suapurensis	51	11	21.6		
*_Cameronieta elongatus_				37	97.4
Periglischrus acutisternus				1	2.6
FAMILY PHYLLOSTOMIDAE SUBFAMILY PHYLLOSTOMINAE					
Lonchorhina aurita	131	21	16.0		
*_Periglischrus gameroi_				39	100
Lonchorhina orinocensis	252	13	5.1		
*_Periglischrus gameroi_				23	100
Macrophyllum macrophyllum	50	5	10.0		
Cameronieta elongatus				1	14.3
Periglischrus sp.				5	71.4
Periglischrus torrealbai				1	14.3
Micronycteris megalotis	101	10	9.9		
Periglischrus iheringi				1	3.4
*_Periglischrus micronycteridis_				35	96.6
Micronycteris microtis	45	1	2.2		
*_Periglischrus micronycteridis_				3	100
Micronycteris minuta	66	3	4.5		
*_Periglischrus micronycteridis_				4	100
Micronycteris nicefori	192	7	3.6		
*_Periglischrus parvus_				18	100
Mimon crenulatum	72	23	31.9		
*_Periglischrus dusbabeki_				68	98.6
Periglischrus iheringi				1	1.4
Phylloderma stenops	28	12	42.9		
Cameronieta elongatus				4	5.7
*_Periglischrus grandisoma_				24	34.3
Periglischrus ojastii				1	1.4
*_Periglischrus paratorrealbai_				40	57.1
Periglischrus torrealbai				1	1.4
Phyllostomus discolor	327	147	44.9		
*_Periglischrus acutisternus_				174	53.2
Periglischrus iheringi				2	0.6
Periglischrus ojastii				3	0.9
Periglischrus paravargasi				5	1.5
*_Periglischrus torrealbai_				143	43.7
Phyllostomus elongatus	117	30	25.6		
*_Periglischrus acutisternus_				57	59.4
*_Periglischrus torrealbai_				39	40.6
Phyllostomus hastatus	504	200	39.7		
*_Periglischrus acutisternus_				334	55.9
Periglischrus caligus				1	0.2
Periglischrus iheringi				3	0.5
Periglischrus ojastii				1	0.2
*_Periglischrus torrealbai_				258	43.2
Tonatia bidens	19	1	5.3		
Periglischrus paratorrealbai				6	85.7
Periglischrus tonatii				1	14.3
Tonatia brasiliensis	51	2	3.9		
*_Periglischrus tonatii_				3	100
Tonatia carrikeri	2	2	100		
*_Periglischrus tonatii_				12	100
Tonatia silvicola	42	5	11.9		
*_Periglischrus tonatii_				38	100
Trachops cirrhosus	362	36	9.9		
Periglischrus ojastii				1	1.0
*_Periglischrus paracutisternus_				103	99.0
Vampyrum spectrum	5	1	20		
Periglischrus iheringi				3	100
SUBFAMILY GLOSSOPHAGINAE					
Anoura caudifer	120	49	40.8		
Periglischrus iheringi				2	1.4
*_Periglischrus paravargasi_				143	97.9
Periglischrus torrealbai				1	0.7
Anoura geoffroyi	190	64	34.2		
Cameronieta elongatus				1	0.6

Appendix 1 (continued)

Periglischrus sp.				1	0.6
Periglischrus iheringi				6	3.4
Periglischrus ojastii				4	2.2
Periglischrus paravargasi				13	7.3
Periglischrus paracutisternus				11	6.2
* *Periglischrus vargasi*				142	79.8
Anoura sp. A.	91	26	28.6		
Periglischrus sp.				1	1.5
Periglischrus herrerai				1	1.5
Periglischrus iheringi				1	1.5
Periglischrus paravargasi				13	20.0
* *Periglischrus vargasi*				49	75.4
Glossophaga longirostris	837	133	15.8		
* *Periglischrus caligus*				325	99.7
Periglischrus iheringi				4	2.2
Periglischrus ojastii				1	0.3
Glossophaga soricina	866	92	10.6		
* *Periglischrus caligus*				255	98.5
Periglischrus iheringi				2	0.8
Periglischrus ojastii				2	0.8
Leptonycteris curasoae	765	56	7.3		
Periglischrus ojastii				3	1.5
* *Periglischrus paracaligus*				190	97.9
Periglischrus torrealbai				1	0.5
Lionycteris spurrelli	175	8	4.6		
* *Periglischrus hopkinsi*				15	100
Lonchophylla robusta	26	2	7.7		
Periglischrus sp.				1	33.3
Periglischrus hopkinsi				2	66.7
SUBFAMILY CAROLLIINAE					
Carollia brevicauda	563	5	0.8		
* *Periglischrus iheringi*				24	92.3
Spinturnix sp.				2	7.7
Carollia perspicillata	4305	16	0.3		
Cameronieta elongatus				1	3.0
Periglischrus sp.				1	3.0
Periglischrus acutisternus				1	3.0
* *Periglischrus iheringi*				13	39.4
Periglischrus ojastii				7	21.2
Periglischrus torrealbai				10	30.3
Carollia sp.	1797	3	0.1		
Periglischrus acutisternus				3	50.0
Periglischrus iheringi				2	33.3
Periglischrus micronycteridis				1	16.7
Rhinophylla pumilio	61	22	36.1		
* *Periglischrus ramirezi*				78	100
SUBFAMILY STURNIRINAE					
Sturnira bidens	16	1	6.2		
* *Periglischrus ojastii*				50	98.0
Periglischrus vargasi				1	2.0
Sturnira bogotensis	4	4	100		
* *Periglischrus ojastii*				4	100
Sturnira erythromos	108	36	33.3		
* *Periglischrus ojastii*				64	100
Sturnira lilium	2291	508	22.1		
Cameronieta elongatus				3	0.2
Periglischrus sp.				4	0.3
Periglischrus acutisternus				1	0.1
Periglischrus caligus				1	0.1
Periglischrus herrerai				2	0.1
Periglischrus iheringi				13	0.9
* *Periglischrus ojastii*				1423	98.3
Sturnira ludovici	363	103	28.3		
Periglischrus herrerai				1	0.5
Periglischrus iheringi				21	9.5
* *Periglischrus ojastii*				198	90.0

Appendix 1 (continued)

Sturnira tildae	218	23	10.5		
Cameronieta elongatus				1	2.5
°*Periglischrus ojastii*				39	97.5
Sturnira sp.	30	1	3.3		
Periglischrus iheringi				3	100
SUBFAMILY STENODERMATINAE					
Ametrida centurio	151	3	2.0		
°*Periglischrus iheringi*				10	100
Artibeus cinereus	438	98	22.3		
Periglischrus acutisternus				2	0.9
°*Periglischrus iheringi*				217	96.9
Periglischrus ojastii				4	1.8
Periglischrus torrealbai				1	0.4
Artibeus concolor	320	2	1.6		
Periglischrus iheringi				3	100
Artibeus fuliginosus	321	4	1.2		
Periglischrus acutisternus				2	33.3
Periglischrus iheringi				2	33.3
Periglischrus torrealbai				2	33.3
Artibeus hartii	126	11	8.7		
°*Periglischrus iheringi*				29	93.5
Periglischrus ojastii				2	6.5
Artibeus jamaicensis	2302	363	15.8		
Periglischrus acutisternus				6	0.5
Periglischrus caligus				3	0.3
Periglischrus gameroi				1	0.1
°*Periglischrus iheringi*				1125	98.1
Periglischrus ojastii				8	0.7
Periglischrus torrealbai				3	0.3
Artibeus lituratus	1620	408	25.2		
°*Periglischrus iheringi*				1091	99.8
Periglischrus ojastii				2	0.2
Chiroderma salvini	29	9	31.0		
°*Periglischrus iheringi*				24	100
Chiroderma trinitatum	67	12	17.9		
°*Periglischrus iheringi*				41	100
Chiroderma villosum	724	2	0.3		
Periglischrus acutisternus				1	50
Periglischrus iheringi				1	50
Ectophylla macconnelli	71	7	9.9		
°*Periglischrus iheringi*				8	88.9
Periglischrus torrealbai				1	11.1
Sphaeronycteris toxophyllum	157	1	0.6		
Periglischrus iheringi				2	100
Uroderma bilobatum	677	213	31.5		
°*Periglischrus iheringi*				641	99.4
Periglischrus ojastii				4	0.6
Uroderma magnirostrum	367	10	2.7		
Periglischrus acutisternus				2	5.1
°*Periglischrus iheringi*				37	94.9
Vampyressa bidens	117	12	10.3		
°*Periglischrus iheringi*				16	88.9
Periglischrus ojastii				2	11.1
Vampyressa pusilla	115	22	19.1		
°*Periglischrus iheringi*				40	100
Vampyrodes caraccioli	23	3	13.0		
Periglischrus iheringi				3	100
Vampyrops aurarius	62	28	45.2		
°*Periglischrus iheringi*				129	100
Vampyrops helleri	821	324	39.5		
°*Periglischrus iheringi*				1020	99.4
Periglischrus ojastii				5	0.5
Periglischrus vargasi				1	0.1
Vampyrops saccharus	3	1	33.3		
Periglischrus iheringi				2	100
Vampyrops umbratus	221	76	34.3		
°*Periglischrus iheringi*				245	97.6

Appendix 1 (continued)

Periglischrus ojastii				6	2.4
Vampyrops vittatus	10	5	10.0		
**Periglischrus iheringi*				20	100
SUBFAMILY DESMODONTINAE					
Desmodus rotundus	964	80	8.2		
Periglischrus acutisternus				14	8.8
Periglischrus caligus				4	2.5
Periglischrus gameroi				2	1.3
**Periglischrus herrerai*				115	72.3
Periglischrus iheringi				6	3.8
Periglischrus ojastii				11	6.9
Periglischrus tonatii				1	0.6
Periglischrus torrealbai				6	3.8
SUPERFAMILY VESPERTILIONOIDEA					
FAMILY NATALIDAE					
Natalus tumidirostris	175	4	2.3		
**Periglischrus natali*				5	100
FAMILY VESPERTILIONIDAE					
Eptesicus andinus	13	2	15.4		
**Spinturnix surinamensis*				4	100
Eptesicus brasiliensis	64	7	10.9		
**Spinturnix surinamensis*				13	100
Eptesicus furinalis	16	1	6.3		
Periglischrus gameroi				1	100
Eptesicus fuscus	4	1	25.0		
**Spinturnix bakeri*				3	100
Eptesicus montosus	36	18	50.0		
**Spinturnix bakeri*				46	100
Myotis albescens	86	34	39.5		
Periglischrus iheringi				1	1.6
**Spinturnix americanus*				62	98.4
Myotis keaysi	55	26	47.2		
**Spinturnix americanus*				59	98.3
Spinturnix bakeri				1	1.7
Myotis nigricans	153	78	50.8		
Periglischrus iheringi				1	0.4
**Spinturnix americanus*				251	99.6
Rhogeessa minutilla	225	80	35.5		
**Spinturnix subacuminatus*				264	100
Rhogeessa tumida	25	8	32.0		
Periglischrus paracutisternus				1	7.7
**Spinturnix subacuminatus*				12	923
Rhogeessa sp.	3	3	100		
**Spinturnix subacuminatus*				13	100
FAMILY MOLOSSIDAE					
Eumops glaucinus	81	2	2.5		
Periglischrus iheringi				1	50
Spinturnix americanus				1	50
Molossops planirostris	241	2	0.2		
Periglischrus acutisternus				1	50
Periglischrus torrealbai				1	50
Molossus ater	410	1	0.2		
Periglischrus iheringi				1	50
Periglischrus sp.				1	50

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ADDENDUM

A major shipment of spinturnicid mites (334 collections, 905 specimens) identified by Machado-Alliston arrived from Venezuela while we were correcting the second galley of this paper. Although the percentages of specimens collected from principal hosts varied somewhat from those given for each species, the additional data confirm the host-parasite relationships reported herein. It is likely that some specimens contained in the delayed shipment were collected in states other than those reported and thus some species probably have a greater geographical distribution than indicated.

Host data for the 334 collections are as follows:

Genus *Cameronieta*

C. thomasi: 3 collections (5 males, 2 nymphs) from *Pteronotus parnellii* (2) and *Carollia castanea* (1).

Genus *Periglischrus*

P. micronycteridis: 6 collections (18 females) from *Micronycteris megalotis.*

P. torrealbai: 7 collections (11 females, 13 males, 4 protonymphs) from *Phyllostomus hastatus.*

P. paratorrealbai: 1 collection (3 females) from *Pyhlloderma stenops.*

P. caligus: 32 collections (131 females, 6 males, 1 deutonymph, 1 protonymph) from *Glossophaga soricina* (28), *Sturnira lilium* (3), and *Phyllistomus hastatus* (1).

P. vargasi: 4 collections (4 females, 1 male) from *Anoura geoffroyi* (3) and *Vanpyrops helleri* (1).

P. hopkinsi: 2 collections (2 females) from *Lionycteris spurrelli.*

P. herrerai: 1 collection (1 male) from *Sturnira lilium.*

P. ojastii: 10 collections (17 females, 4 males, 1 deutonymph) from *Sturnira lilium* (3), *Glossophaga soricina* (3), *Tadarida europs* (1), *Carollia perspicillata* (1), and *Vanpyrops helleri* (1).

P. ramirezi: 5 collections (4 females, 2 males, 1 deutonymph) from *Rhinophylla pumilio* (3), *Carollia perspicillata* (1), and *Chiroderma villosum* (1).

P. iheringi: 260 collections (669) specimens) from *Artibeus jamaicensis* (116), *A. lituratus* (60), *A. hartii* (62), *A. cinereus* (1), *Vampyrops umbratus* (10), *V. helleri* (1), *Uroderma bilobatum* (3), *Glossophaga soricina* (3), *Chiroderma salvini* (1), *Anoura caudifera* (1), and *Phyllostomus hastatus* (1).

Genus *Spinturnix*

S. americanus: 2 collections (1 female, 2 males) from *Myotis nigricans*.

S. bakeri: 1 collection (1 protonymph) from *Eptesicus brasiliensis*.

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by

Robert C. Saunders

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VENEZUELAN MACRONYSSIDAE (ACARINA: MESOSTIGMATA)

by

Robert C. Saunders[1]

INTRODUCTION

Mites of the family Macronyssidae are primarily ectoparasites of rodents, marsupials, bats, and birds. Some species are of medical importance because they attack man in the absence of their natural hosts. Some are known to harbor or transmit causative agents of several zoonotic diseases such as murine typhus (Worth and Rickard, 1951), rickettsial pox (Philip and Hughes, 1948; and Strandtmann and Wharton, 1958), eastern equine encephalitis (Clark, Lutz, and Fadness, 1966), and coxsackie virus disease (Schwab, Allen, and Sulkin, 1952). Not only are some species of mites involved directly in the transmission of disease agents to man but they may play an important role in maintenance cycles of arthropod-borne zoonoses as well. One species is a proven vector of the virus *Ornithosis bedsoniae* (Eddie, Meyer, Lambrecht, and Furman, 1962) and another of the filarial worm *Litomosoides carinii* (Williams and Brown, 1946). Yunker (1964 and 1973) reviewed the importance of parasitic mites associated with laboratory animals and indicated the species, some of them macronyssids, which are potentially dangerous to man. Although macronyssid mites are known vectors of some disease causing agents, previous studies, for the most part, have been restricted to taxonomic discussions on the generic level (Till and Evans, 1964) or specific host groups (Radovsky, 1967).

The results of a survey of macronyssid mites of vertebrates, collected by the Smithsonian Venezuelan Project (SVP), are presented in this paper. There has been no previous comprehensive study of the macronyssid mites of Venezuela. Collecting was conducted by field teams under the direction of Norman E. Peterson, M. D. Tuttle, and A. L. Tuttle between July 1965 and September 1968. Hosts were collected throughout Venezuela and a variety of habitats were sampled.

Of the more than 5,000 specimens of macronyssid mites that were collected, the majority will be deposited in the Smithsonian Institution, Washington D.C., but representatives of all taxa will be deposited at the Universidad Central de Venezuela, Caracas.

Grateful appreciation is extended to many people who have been associated with this study. Special acknowledgments are given to Dr. Vernon J. Tipton, Director, Center for Health and Environmental Studies, Brigham Young University, and Dr. Charles O. Handley, Jr., Smithsonian Institution, for logistic support. Dr. C. Selby Herrin assisted with the preparation of the final draft of the manuscript.

EVOLUTION OF THE MACRONYSSIDAE

For every advantage gained by a parasite in its relationship with a host there is a corresponding surrender of independence. Modifications in morphology and life cycles may be advantageous in one situation, *e.g.*, on a particular host, but may be disadvantageous in another. The morphology of a host, its mode of life, *e.g.*, whether it is sedentary or wide ranging, solitary or colonial, nomadic or tends to return to the same place to build a nest, as well as ambient conditions, are factors which affect the kinds of parasites a host may harbor. Other characteristics which affect host-parasite relationships are the host's ecological tolerance and whether it burrows in the ground or has no direct contact with the earth. In addition, the morphology of the parasite, its vagility and ecological tolerance, the number of offspring it produces, whether eggs or living young are produced, and whether all stages are obligate parasites or some stages are free-living are all influenced by host-parasite relationships.

Probably parasitism developed as a result of continued close association of predatory mites with potential vertebrate hosts. The abundance of necessary elements for survival afforded by a vertebrate host, *e.g.*, food and shelter, gradually replaced the less dependable survival elements associated with a predatory mode of life. With an increase in host specificity and development of intimate host-parasite relationships, adaptive morphological changes occurred in parasitic mites.

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The transition from free-living to parasitic states can be observed by examining the existing mite faunas within various groups of parasitic mites. Free-living, predatory mites are characterized by heavy sclerotization and massive chelae. The closely related nest-dwelling facultative parasites, which are one step removed from free-living forms, generally have a less heavily sclerotized idiosoma and the chelae are somewhat smaller, as seen in many of the mites of the subfamily Laelapinae. At this juncture in the evolutionary process, true host specificity has not developed and a more appropriate term would be "nest specificity," as proposed by Wharton (1957). The host-parasite relationship at this point may be said to be generalized.

As host-parasite relationships become more intimate and specificity increases, changes in the morphology of parasitic mites occur which allow them to benefit from specific characteristics of the host. The first and more conspicuous changes often involve reduction in sclerotization of the idiosoma and a decrease in the number of setae. Also, as the parasites become more specialized, the mouthparts become better fitted for piercing and sucking, thus aiding in the blood-feeding process; they may also be modified for attachment to prevent removal when the host moves or preens. There are changes in body structure that aid the mite in either adhering to its host or moving rapidly through the pelage or plumage, *e.g.*, flattening of the body, unidirectional orientation of the setae, development of caudally directed spines and spurs on the coxae, and large tarsal claws. In some instances, parasites with very intimate host-parasite relationships have developed morphological characteristics which almost entirely limit their existence to one host or a closely related group of hosts. Such characteristics as size and strength of tarsal claws, number and size of setae, and relative length of legs may all change as dependence on the host increases. These adaptive features become apparent when families of parasitic mesostigmatid mites are compared. As mentioned earlier, the more generalized parasites (*e.g.*, most of the Laelapinae) have heavy sclerotization and generally a full complement of setae. The more specialized forms (*e.g.*, the Macronyssidae) tend to have less heavily sclerotized bodies and a general reduction in setation.

The Macronyssidae apparently are derived from the Laelapidae. The macronyssid genera retaining the most characteristics indicating a laelapine origin are *Ichoronyssus, Bewsiella,* and *Synasponyssus,* which are found on bats (Radovsky and Furman, 1969) and which are similar to the laelapid bat parasites *Neolaelaps* and *Notolaelaps.* Apparently this group of genera forms the stem from which the remainder of the family Macronyssidae evolved. Important facts that give credence to this hypothesis are that the laelapid bat parasites are restricted to bats of the primitive suborder Megachiroptera, while the Macronyssidae are restricted to the more recent Microchiroptera. These facts have led to the conclusion that the Macronyssidae first evolved and radiated on bats and secondarily acquired other hosts (Radovsky, 1969). Supporting evidence is provided by the host relationships of the two subfamilies of Macronyssidae. The more primitive Macronyssinae, which are found almost exclusively on bats, exhibit the greatest morphological diversity and the greatest degree of host specificity, indications of long association with particular hosts. The Ornithonyssinae, on the other hand, have a low degree of host specificity and many species of this subfamily have nonchiropteran hosts. Furthermore, they are more uniform morphologically, and probably biologically, and there are more species, all indications of recent evolution.

The Macronyssidae appear to have gone through several phases of adaptive radiation, some of which have taken place largely or entirely in the Neotropics. That the Neotropics are particularly rich in the number of macronyssid species is demonstrated by the species diversity in Venezuela. One phase involved macronyssine evolution on bats, apparently beginning at an early stage in the history of the Neotropical chiropteran fauna. Several endemic genera arose, including *Parichoronyssus, Radfordiella,* and *Macronyssoides,* particularly on bats of the superfamily Phyllostomoidea. Even though phyllostomoid bats were apparently the hosts during early radiation, there has been considerable movement to other bat host groups. *Radfordiella* and *Macronyssoides* are still essentially restricted to phyllostomoid hosts, while *Parichoronyssus* has become widespread within the Phyllostomoidea and some species even occur on emballonurid bats.

A second phase of radiation involved the ornithonyssines, which were perhaps late arrivals from the North (Radovsky, 1974). This phase produced the genera *Ornithyonyssus*, *Pellonyssus*, and *Draconyssus*, which are not associated with bats, as well as bat parasites, including *Chiroptonyssus*, which is endemic to the New World. Although there is strong evidence that *Ornithonyssus* was restricted to the New World in pre-Columbian times, three species of this genus have become extremely widespread, essentially cosmopolitan, (*O. bacoti* on rodents and *O. bursa* and *O. sylviarum* on birds). The spread of these species apparently was facilitated by their adaptability to house rats (*O. bacoti*) and domestic fowl (*O. bursa* and *O. sylviarum*) that were disseminated as a result of movement of human beings from one area to another. After this dissemination, the mites became permanently established in the Old World by transfer to native species of rodents and birds. Thus, a particularly low level of host specificity, in combination with human activity, has enabled these mites to achieve a remarkably wide geographic distribution. Other parasitic mites, such as *Laelaps nuttalli*, associated with house rats, are less adaptable to establishment on native hosts, possibly due to competition with other species of mites or less adaptability to ambient variations. Thus, they have narrower geographic distributions than *O. bacoti*.

"Mesostigmatic parasites have evolved principally towards simplification of the life cycle: that is, the number of separate stages and the number of active stages may each be reduced." (Radovsky, 1969:468). The tendency toward simplification is influenced by the trophic advantages of parasitism. Also, the chance that mites in inactive stages may be lost from the host results in increased pressure toward intrauterine development of early stages. Such is the case in the Spinturnicidae, which are host-specific and spend their entire life cycle on the host.

In the Macronyssidae, the larval and deutonymphal stages are quiescent and nonfeeding and generally are found on a substrate off the host. This adaptive modus contrasts with the permanently parasitic Spinturnicidae but is nonetheless associated with a high level of specialization for successful parasitism. The short duration of the larval and deutonymphal stages of Macronyssidae compensates for their relative defenselessness. Typically, but with a number of exceptions, unembryonated eggs are deposited on surfaces of the roost or nest of the host animal. The protonymph, unlike the larva, is active and searches out a host. After feeding to repletion, the protonymph molts into a deutonymph which is able to molt to the adult stage without further feeding. The need for only a single feeding period prior to adulthood, with resulting greater chance of reaching maturity, relates to a morphological and functional divergence between protonymphs and adults in the Macronyssidae.

The protonymph remains attached and feeds for a period of days, developing a new cuticle that greatly increases its capacity for engorgement. In contrast, the adults are rapid feeders. The factor of attachment may also enhance dissemination of this group of mites, as the protonymphs may be carried considerable distances by the host to a secondary nesting or roosting site before the protonymph completes engorgement and drops off the host. This may account for some of the atypical hosts seen in the Venezuelan records, particularly among bats which frequently roost in colonies in which several species of bats are represented. Since the adult mite must seek out a blood meal at the new location, the host it finds may not be the same host species that the protonymph fed upon.

It appears that the life cycles of macronyssid mites have been greatly affected by their host-parasite relationships. The prototype mite of the family Macronyssidae was probably a bat parasite, as most of the species of the family are now bat parasites and their life histories are consistent with that which would be expected from a long association of parasites with a highly vagile group of hosts. Bats which live in colonies afford greater security, as far as availability of a blood meal is concerned, than do potential hosts which are solitary. Even though development of some stages of the parasite occurs off the host, the problems of host finding are minimized when hosts occur in large colonies.

Among the Macronyssidae it appears that species of the subfamily Macronyssinae have had the longest association with bats, and it is within this group that the earliest radiation took place. The oldest members of the subfamily Ornithonyssinae were probably parasites of bats, but some species of the subfamily later acquired nonchiropteran hosts secondarily as a result of early radiation (Radovsky, 1969). It is probable that species which have been associated with their hosts for the longest period of time (*i.e.*, Macronyssinae) exhibit the greatest degree of host specificity, while those macronyssid species which have acquired nonchiropteran hosts in more recent times (*i.e.*, Ornithonyssinae) have broader host tolerances and low host specificity.

Family Macronyssidae

The concept of the family Macronyssidae in this paper is essentially the same as that proposed by Radovsky in his monograph on laelapid and macronyssid mites parasitic on bats (1967), and later expanded to include other parasitic Mesostigmata (1969). Radovsky recognized two subfamilies: Macronyssinae, primarily on bats, and Ornithonyssinae, on bats, rodents, marsupials, birds, and reptiles.

The 13 genera included in the Macronyssinae are: *Acanthonyssus, Argitis, Bewsiella, Chiroecetes, Ichoronyssus, Liponysella, Macronyssoides, Macronyssus, Megistonyssus, Nycteronyssus, Parichoronyssus, Radfordiella,* and *Synasponyssus.* The 8 genera included in the Ornithonyssinae are: *Chiroptonyssus, Cryptonyssus, Draconyssus, Lepidodorsum, Lepronyssoides, Ornithonyssus, Pellonyssus,* and *Steatonyssus.* Fifteen of these, plus one unnamed genus, have been identified among the material collected by the Smithsonian Venezuelan Project. Ten of these genera are discussed in the following accounts. They are listed alphabetically under the appropriate subfamily heading. The genera *Cryptonyssus* and *Pellonyssus* are each represented in the SVP collection by only 1 or 2 specimens, and these could not be identified to species. The genera *Macronyssus, Parichoronyssus, Steatonyssus,* and new genus N are being treated by other workers at present and thus are included only in the key and in the host-parasite list. A summary of the SVP macronyssid material can be found in the host-parasite list following the taxonomic accounts. Not represented in the SVP collections are the genera *Bewsiella, Ichoronyssus, Liponysella,* and *Megistonyssus,* found only in the Old World, and the genera *Lepronyssoides* and *Synasponyssus,* reported from the New World but not recorded from Venezuela.

Key to the Genera of Macronyssidae in Venezuela

(Females)

1. Chelicerae with second segment elongate, stylet-like; parasitic on reptiles ...... *Draconyssus*
Chelicerae with second segment normal, not elongate; parasitic on birds or mammals 2

2. Dorsal plate divided; palpal trochanter usually with blade-like ventral process 3
Dorsal plate entire; process of palpal trochanter variable 4

3. Sternal plate about twice as wide as long, with strongly sclerotized posterior margin; sternal seta I about as large as sternal seta II; parasitic on bats ...... *Steatonyssus*
Sternal plate very narrow, arched, lacking sclerotized posterior margin; sternal seta I much smaller than sternal seta II; parasitic on birds ...... *Pellonyssus*

4. Coxae I-III all with one or two heavy ventral spurs, some of which may be setigerous; genua and tibiae II-IV with proximally recurved ventral spurs 5
Coxae I-III variable (coxae II-III may have nonsetigerous spurs); genua and tibiae II-IV without ventral spurs 6

5. Dorsal plate with clusters of punctae at bases of setae giving grapelike appearance; peritreme short and stout; parasitic on *Oryzomys* spp. ...... *Argitis*
Dorsal plate not as above; peritreme long and slender; parasitic on *Proechimys* spp. ...... *Acanthonyssus*

6. Some idiosomal setae (especially caudal ones) barbed 7
All setae bare 9

7. Sternal plate with only 2 pairs of setae; parasitic on *Oryzomys albigularis* ...... *Lepidodorsum*
Sternal plate normally with 3 pairs of setae; parasitic on various mammals and birds 8

8. Spur on palpal trochanter small or absent; caudal setae peglike, with multiple barbs; parasitic on bats ...... *Chiroptonyssus*
Spur on palpal trochanter bladelike; all setae slender and generally with only 1 barb; parasitic on birds and mammals ...... *Ornithonyssus*

9. Dorsal setae minute; coxae II-III with ventral spurs; parasitic on *Lonchophylla robusta* ...... *Chiroecetes*
Dorsal setae not minute; coxae generally without ventral spurs, but sometimes ridged 10

10. Third pair of sternal pores on posterior margin of sternal plate; all legs stout, laelapoid in appearance; parasitic on bats .... *Parichoronyssus*
    Third pair of sternal pores on unarmed integument; legs generally slender, not stout 11

11. Leg I stouter than legs II-IV, and claws arise directly from tarsus (no pretarsus); coxae II and III with small inapparent ridges; parasitic on *Desmodus youngi* .... *Nycteronyssus*
    Leg I similar to legs II-IV, and claws arise from pretarsus; coxae II and III frequently with definite ventral ridges 12

12. Linear sculpturing entirely absent from ventral armature; anterior margin of coxa II with 2 small separate spurs or single spur with bifid tip; parasitic on bats ...... *Radfordiella*
    Linear sculpturing present on one or more ventral plates; anterior margin of coxa II with single spur, rarely with bifid tip 13

13. Last pair of sternal setae on narrow extension of sternal plate; numerous setae on ventral surface; parasitic on bats of genera *Noctilio* and *Molossus* .... n. gen. "N"
    Last pair of sternal setae on posterior portion of plate (which lacks narrow extension); ventral surface with few setae 14

14. Sternal glands present; fixed chela with 2 hook-like ventral hyaline processes; parasitic on bats .... *Macronyssus*
    Sternal glands absent; fixed chela not as above 15

15. Ventral ridges usually present on coxae II-IV; epigynial plate with narrow membranous projection of anterior margin extending beyond posterior margin of sternal plate; dorsal plate not strongly tapered, covering most of dorsum; parasitic on bats .... *Macronyssoides*
    Ventral ridges absent from coxae; epigynial plate with anterior margin inapparent or short, broad, and inconspicuous; dorsal plate strongly tapered, leaving much of dorsum uncovered; parasitic on bats .... *Cryptonyssus*

Subfamily Macronyssinae

This subfamily is found primarily on bats. It includes mites very diverse, both in form and in host-parasite relationships. The female chelicerae are uniform in diameter throughout their length, and the chelae are obvious. Both digits of the chelae are present and subequal. The male holoventral plate may be entire or divided, and the spermatodactyl is about twice the size of the movable digit. The fixed digit of the male chelae is always present and generally is as long as the movable digit.

Genus *Acanthonyssus* Yunker and Radovsky

Acanthonyssus Yunker and Radovsky, 1966:92; Yunker and Saunders, 1973:371 (Redefined).

Type Species: *Ichoronyssus dentipes* Strandtmann and Eads, 1947.

Small mites (adult less than 500 μ long); idiosomal setae relatively short, bare except for M_{11} of nymphs; adult dorsal plate entire, broadly rounded posteriorly. All coxae (active stages) with 1 or 2 stout ventral spurs, some bifid and setigerous; coxa II with large, sharp anterodorsal spur; telofemora III and IV, genua, and tibiae II-IV with strong, proximally recurved ventral spurs; tarsi II-IV each with pair of small setigerous spurs; palpal apotele two-tined; chelicerae slender and elongate.

Acanthonyssus proechimys Yunker and Saunders

Acanthonyssus proechimys Yunker and Saunders, 1973:371.

Venezuelan Records (447 females, 234 males, and 46 nymphs):

Four hundred twenty-six females, 222 males, and 40 nymphs ex 118 *Proechimys semispinosus* were collected in the following states, listed in order from greatest to least number of collections: Zulia, Apure, Barinas, Carabobo, T. F. Amazonas, Sucre, Lara, Falcón, and Trujillo; 12 females, 11 males, and 4 nymphs ex 10 *P. guyannensis*, from T. F. Amazonas and Bolívar. There were also 9 females, 1 male, and 2 nymphs off *Heteromys anomalus*, *Sigmodon hispidus*, *Zygodontomys brevicauda*, *Rattus rattus*, *Sciurus granatensis*, and *Monodelphis brevicaudata*. Some of these hosts, particularly the nonrodent host, are presumed to be accidental. Infested hosts were found at elevations from 24-1355 m, but most were collected at low elevations.

REMARKS

A. proechimys is similar to *A. dentipes* (Strandtmann and Eads) but can be distinguished on the basis of the length-width ratio of the sternal plate (longer in *A. proechimys;* first pair of sternal setae do not reach the posterior margin of plate), length of the anal plate (shorter in *A. proechimys*) and length of the peritreme (extends only to middle of coxa 1 in *A. proechimys*) (Yunker and Saunders, 1973). In addition to morphological differences, there is a definite difference in host preference. *A. proechimys* is associated primarily with species of *Proechimys* while *A. dentipes* is most frequently associated with *Sigmodon hispidus.*

Variations in the dimensions of the dorsal plate of the female and idiosomal chaetotaxy of the male were noted in the material examined. In some females the dorsal plate was considerably shorter than that of the holotype, while in others the plate was narrower but just as long as that of the holotype. Major variations in the male were in the number of setae on the dorsal plate (24-26 pairs) and on the holoventral plate (due to asymmetrical erosion of the plate).

Genus *Argitis* Yunker and Saunders

Argitis Yunker and Saunders, 1973:378.

Type Species: *Argitis oryzomys* Yunker and Saunders, 1973.

Small mites (adults less than 500 μ long); adult dorsal plate entire, ornamented with large punctae, forming grapelike clusters of cells at setal bases and near anterolateral margins; idiosomal setae short, bare; peritreme wide and short, terminating at level of coxa III. All coxae with short ventral spurs, some of them setigerous, bifid or truncated. Genua and tibiae II-IV each bear long, robust, proximally recurved ventral spurs. Tarsi II-IV each with pair of small recurved setigerous spurs.

Argitis oryzomys Yunker and Saunders

Argitis oryzomys Yunker and Saunders, 1973:379.

VENEZUELAN RECORDS (9 females and 3 males):

Nine females and 2 males ex *Oryzomys concolor* (SVP 12750), Bolívar, 44 km ESE Caicara (Hato La Florida), 43 m, 15.IV.67; and 1 male ex *O. bicolor* (SVP 13451), Sucre, 9 km NE Güiria, 4 m, 14.VI.67.

REMARKS

Argitis shares many macronyssid characters with and is similar to *Acanthonyssus.* It can be distinguished from *Acanthonyssus* by the grapelike clusters of cells on the dorsal plate.

Argitis oryzomys was one of the least commonly collected mites in Venezuela, but careful examination of *Oryzomys* may result in extension of the known distribution of this species. The above collections (only known specimens of this species) were taken at widely separated localities.

Genus *Chiroecetes* Herrin and Radovsky

Chiroecetes Herrin and Radovsky, 1974:347.

Type Species: *Chiroecetes lonchophylla* Herrin and Radovsky, 1974.

Idiosomal armature reduced and lacking sculpturing. Dorsal plate with prominent anterolateral shoulders, narrowing medially, and ending in bluntly pointed tip; with 21 pairs of minute setae. Peritreme with posterior portion near stigma septate; peritremal plate not connected to any other plates. Sternal plate about as long as wide, with irregular anterior and emarginate lateral margins; with only 2 pairs of setae and 1 pair of pores. Epigynial plate long and narrow with bluntly pointed posterior tip; genital setae marginal. Opisthosomal setae slender and not barbed, those near anal plate on venter acuminate with inflated base. Legs moderately long; claws stout and subequal; some hypotrichy present. Anteromarginal spur of coxa II absent; coxae II and III each bearing well developed, blunt, ventral spur. Palpal trochanter with small, spurlike process; apotele two tined. Chelicerae rather short and stout.

Chiroecetes lonchophylla Herrin and Radovsky

Chiroecetes lonchophylla Herrin and Radovsky, 1974:348.

VENEZUELAN RECORD (1 female):

The single specimen was taken off a long-tongued bat, *Lonchophylla robusta* (SVP 22129), Zulia, 21 km SW Machiques (near Kasmera), 270 m, 17.IV.68.

REMARKS

This genus appears to be closest to the *Radfordiella, Parichoronyssus* and *Macronyssoides* group of the Macronyssinae (Herrin and Radovsky, 1974). It has most features in common with *Radfordiella.*

Genus Macronyssoides Radovsky

Macronyssoides Radovsky, 1966:96; 1967:166.

Type Species: *Ichoronyssus kochi* Fonseca, 1948.

"Dorsal plate of female with 24 to 27 setal pairs; S8 absent. Sternal plate without sternal glands (but one species with fine punctae in an area delimited by sculptured lines, posteromedial to first pair of sternal pores). Epigynial plate strongly tapered, with pointed or very narrowly rounded tip; anterior margin with long median projection; without scalelike anterior sculpturing. Coxae II to IV of adults with or without distinct ventral ridges, (present in described species; absent in some unassigned material). Female chelae simple, without spinelike processes; tip of fixed chela with expanded hyaline margin. Palpal trochanter of female with distally arising bladelike process; palpal process absent in male. Protonymph with pygidial plate bearing 4 setal pairs; S8 absent. Leg I of protonymph stouter than other legs, with stronger claws; coxa I usually with strong ventral ridge (present in all described species, but ridge lacking in some unassigned material)." (Radovsky, 1967:166)

REMARKS

Macronyssoides resembles the genus *Macronyssus* but can be distinguished by the absence of sternal glands in the female, by the presence of a bladelike process on the palpal trochanter, and by a strongly tapering, pointed epigynial plate. Protonymphs of the two genera differ in that *Macronyssoides* has 11 setal pairs on the podosomal plate (10 in *Macronyssus*), four setal pairs on the pygidial plate (5-7 pairs in *Macronyssus*), and the process on the palpal trochanter is bladelike as in the female (ridgelike in *Macronyssus*). Males of *Macronyssoides* lack the palpal process. Only the male of *M. kochi* has been described.

Macronyssoides conciliatus Radovsky

Macronyssoides conciliatus Radovsky, 1967:169.

VENEZUELAN RECORDS (20 females and 114 protonymphs):

Eight females and 57 protonymphs ex 16 *Vampyrops umbratus;* 7 females and 37 protonymphs ex 7 *V. aurarius*. The remaining specimens were collected from 4 other species of bats, 2 birds, a shrew (*Cryptotis thomasi*), and a rat (*Rattus rattus*). Mites collected from hosts other than bats probably represent contamination. Associations of mites with bats other than species of Vampyrops may be the result of several species of bats sharing the same roosting areas and are considered accidental.

REMARKS

The type series of this species was collected in Panama off *Vampyrops vittatus*. These Venezuelan collections represent the only other published records of *M. conciliatus*. Species of *Vampyrops* appear to be the natural hosts. Most specimens were collected at elevations above 1000 meters. States or districts in which collections were made, in order of diminishing number of collections, are: Dto. Federal, Bolívar, Miranda, Barinas, Mérida, Yaracuy, and Carabobo.

Macronyssoides kochi (Fonseca)

Ichoronyssus kochi Fonseca, 1948:278.

Macronyssoides kochi Radovsky, 1966:94; 1967: 167; Dusbabek, 1969:321.

VENEZUELAN RECORDS (105 females, 1 male, and 316 protonymphs):

Twelve females, 1 male, and 252 protonymphs ex 80 *Artibeus jamaicensis;* 57 females and 13 protonymphs ex 8 *Artibeus lituratus;* 19 females and 10 protonymphs ex 9 *Vampyrops helleri*; 7 protonymphs ex 6 *Carollia perspecillata;* and 1 female and 13 protonymphs ex 1 *Desmodus rotundus*. The remaining 37 specimens were collected from various species of bats of the families Emballonuridae, Mormoopidae, and Phyllostomidae, and from a marsupial. The latter record is probably an error, and most of the miscellaneous bat hosts are considered to be accidental host-parasite associations.

REMARKS

M. kochi was collected throughout Venezuela. However, most of the collections came from the northwestern portion of the country, particularly from Zulia and Trujillo. There were also numerous collections from Bolivar and T. F. Amazonas. Some collections were made at an elevation of 1810 m but the majority of specimens came from between 100 and 200 meters.

The only male collected in Venezuela differs somewhat from the description given by Radovsky (1967:168), but the females and protonymphs from the same collection fit his description. For this reason, I have tentatively assigned this specimen to *M. kochi* awaiting additional material or further study.

Genus *Nycteronyssus* Saunders and Yunker

Nycteronyssus Saunders and Yunker, 1973:381.

Type Species: *Nycteronyssus desmodus* Saunders and Yunker, 1973.

Large mites (adult over 600 μ long). Dorsal plate entire but rather small, with 20 pairs of setae (F_1 pair very small and remainder robust, bare, spiniform). Peritremal plate long, connecting with dorsal plate anteriorly; peritreme short, wide, terminating over coxa III. Sternal plate wider than long, lateral margins slightly concave, with three pairs of setae. Epigynial plate well removed from sternal plate, short, narrow, linguiform, and with single pair of setae. Leg I short and robust, its claws massive and arising directly from tarsus; legs II-IV normal.

Nycteronyssus desmodus Saunders and Yunker

Nycteronyssus desmodus Saunders and Yunker, 1973:382.

Venezuelan Record (1 female):

The single female from which this species was described was taken from a vampire bat, *Desmodus youngi* (SVP 26680), T. F. Amazonas, 163 km ESE Pto. Ayacucho (San Juan, Rio Manapiare), 155 m, 14.VII.67.

Remarks

This is a unique species having characteristics of both ecto- and endoparasitic forms. Due to its host association and the majority of characteristics being typically macronyssid, it is assigned to the family Macronyssidae, subfamily Macronyssinae.

Genus *Radfordiella* Fonseca

Radfordiella Fonseca, 1948:270.

Type Species: *Radfordiella oudemansi* Fonseca, 1948.

Small mites with moderately long, thick legs. Female dorsal plate abruptly narrowed posterior to setal pair M8; setal pair M11 subterminal; with 22-26 pairs of setae; setae S8 absent. Ventral plates without sculpturing and sternal glands absent. Coxae without ventral ridges or with weak ridges on coxae II and III or II-IV. Coxa II with bifid anterior spur or two separate anterior spurs. Palpal trochanter of female with bladelike process; that of male with weak ridge or lacking process. Protonymph with 3 or 4 pairs of setae on pygidial plate.

Remarks

In lieu of a separate discussion for each of the five or more species of this genus found in Venezuela, the following comments and discussion contributed by Dr. Frank J. Radovsky (1974), the authority on this genus, are provided:

"The genus *Radfordiella* is an important element among the mites parasitic on Neotropical bats, yet only one species was named prior to 1967. That the extensiveness of this faunal element is only now beginning to be appreciated relates to the limited amount of work on acarine parasites in the Neotropics and to the relatively small size of these compared to other macronyssids. Nonetheless, it is difficult to account for the late discovery of *Radfordiella desmodi*, a regular and abundant parasite of the common vampire bat, *Desmodus rotundus*.

"Radovsky, *et al.* (1971), recognized 6 species of Radfordiella in reviewing that genus in relation to describing 3 new species with protonymphs parasitic in the mouths of glossophagine bats (only the protonymphs of these 3 species are known). All species appear to have Phyllostomoidea as maintaining hosts.

"The analysis of the collections of Radfordiella from Venezuela is still in progress, but the findings can be summarized. Most of the collections are of the 3 species previously known from adults as well as protonymphs: *R. oudemansi* Fonseca, 1948; *R. desmodi* Radovsky, 1967; and *R. carolliae* Radovsky, 1967. The greatest number of collections were *R. desmodi*, involving approximately 100 individual hosts, of which more than 85 percent were *Desmodus rotundus*. The other hosts recorded for *R. desmodi* were largely phyllostomid bats, in most cases with only a single specimen of the mite collected. Two records from birds, coincident with collections from *D. rotundus*, need to be verified. The resulting picture is one of a high degree of species specificity, bearing out previous observations on this mite, especially where numerous collections have been made in Panama and Trinidad. The closely related species *R. carolliae* appears to be specific at the generic level, *i.e.*, on bats of the genus *Carollia*. These results also tend to confirm the specific distinctness of this mite from *R. desmodi*. *R. oudemansi* was found on at least 7 genera of phyllostomoid bats, confirming earlier observations that suggested a lower level of specificity for this mite.

"In addition to the known species noted above, at least 2 undescribed species of *Radfordiella* have been distinguished thus far in the Venezuelan collections. These are from the bats *Peropteryx* and *Lionycteris*, and both are related to the *desmodi-carolliae* species group. Other mites represented by single or a few specimens are possibly new but require further study; they are from such phyllostomid hosts as *Tonatia*, *Sturnira*, *Phylloderma*, and *Lonchorhina*. Each of these mites of questionable specific status is obviously related either to the *desmodi-carolliae* group or to the *oudemansi* group.

"In summary, the Venezuelan collections of *Radfordiella* support this as being a genus of major importance and of which only a relatively small fraction of the existing species are probably known at present. The genus apparently originated as parasites of Phyllostomoidea and has evolved to some extent with this host group. Therefore, the genus may prove to be useful in analyzing the phylogenetic relationships of their hosts. There is a wide range of levels of specificity in the genus from host species to host superfamily. The host-parasite relationships are scarcely studied, with most information relating to the occurrence of protonymphs of certain species in specific loci in the mouth of long-nosed, nectar- and pollen-feeding bats, and offer an intriguing area for future investigation."

Subfamily Ornithonyssinae

These mites represent the most successful outgrowth of earlier radiation in the Macronyssidae. All are haematophagus with a considerable capacity for engorgement. They are more uniform morphologically and probably biologically than the Macronyssinae, but they are also more numerous and are found on a greater variety of hosts, including reptiles, birds, and mammals (both bats and nonaerial forms). Adult females lack sternal glands and frequently setal pair D7 is lacking on adult dorsal armature. The epigynial plate generally is narrowly rounded or pointed. The female palpal trochanter has a bladelike process and the dorsal setae generally are slender and barbed.

Genus *Chiroptonyssus* Augustson

Chiroptonyssus Augustson, 1945:46; Radovsky, 1967:176.

Type Species: *Chiroptonyssus texensis* Augustson, 1945. (=*Liponyssus robustipes* Ewing, 1925).

Caudal setae short and stout, with 2 rows of barbs. Dorsal plate entire, with 30-36 pairs of setae. Palpal trochanter with spurlike ridge. Leg II stouter than leg I; coxa II with anterior marginal spur. Sternal plate rectangular, with or without posterior lateral extensions. Epigynial plate faintly sculptured, tapering to narrow point.

REMARKS

For a more detailed description and notes on synonomy of this genus see the excellent review of macronyssid and laelapid parasites of bats by Radovsky (1967:176).

Chiroptonyssus haematophagus (Fonseca)

Liponissus (sic) *haematophagus* Fonseca, 1935a: 25

Chiroptonyssus haematophagus Radovsky, 1966-94; 1967:181; Dusbabek, 1969:323.

VENEZUELAN RECORDS (12 females, 1 male, and 381 protonymphs):

Nine females and 180 protonymphs ex 29 *Molossus ater;* 38 protonymphs ex 5 *M. bondae;* 1 female, 1 male, and 113 protonymphs ex 11 *M. molossus;* 10 protonymphs ex 3 *M. aztecus;* and 2 females and 1 protonymph ex 3 *Tadarida gracilis.* The remainder of the specimens occurred in groups of from 1 to 10 on 1 or 2 individuals of a variety of bats, rodents, and a marsupial. The latter two hosts are considered erroneous records or work table contaminations, as this species is strictly a bat parasite.

REMARKS

This species has been known previously only from the type collection from Brazil and the following countries: Cuba, Mexico, Trinidad, and Panama (Dusbabek, 1969). It is here recorded for the first time from Venezuela. The specimens collected agree with the description given by Radovsky (1967) in his review of macronyssid and laelapid parasites of bats.

The dorsal plate of female *C. haematophagus* tapers to a blunt point and has 32 pairs of setae; there is a slight constriction between the main part of the sternal plate and the posterior sternal setae, but not as distinct as in *C. venezolanus*. The male has a stout, curved spur on trochanter IV. Such a spur is lacking in *C. robustipes* and on femur IV of *C. venezolanus.* Protonymphs of *C. haematophagus* have 5 pairs of setae on the unarmed venter, while those of *C. robustipes* have 7 pairs. Protonymphs of *C. robustipes* and *C. haematophagus* lack the blunt lateral spur on coxa I which is found in *C. venezolanus.*

The known host range of *C. haematophagus* is expanded with the addition of the following new hosts: *Molossus aztecus* and *M. bondae.*

Chiroptonyssus robustipes (Ewing)

Liponyssus robustipes Ewing, 1925:20.

Chiroptonyssus texensis Augustson, 1945:46.

Chiroptonyssus robustipes Fonseca, 1948:284.

VENEZUELAN RECORDS (16 protonymphs):

Thirteen protonymphs ex 1 *Tadarida brasiliensis* (SVP 4009), Merida, 4 km E Tabay (La Mucuy), 2107 m, 8. III. 66; 1 protonymph ex *Tadarida brasiliensis* (SVP 4019), same data as above except 9.III.66; and 2 protonymphs ex *Sturnira ludovici* (SVP 4025), same data as above.

REMARKS

Chiroptonyssus robustipes is very similar to *C. haematophagus* but can be distinguished by the characteristics given in the remarks section under the latter species. *C. robustipes* was encountered infrequently in Venezuela on *Tadarida brasiliensis* and *Sturnira ludovici.* This latter record may be in error or due to contamination, as *C. robustipes* has been recorded previously from molossid bats only (primarily species of *Tadarida;* see Radovsky, 1967).

Chiroptonyssus venezolanus (Vitzthum)

Liponissus (sic) *venezolanus* Vitzthum, 1932:9.
Chiroptonyssus venezolanus Radovsky, 1966:94; 1967:182; Dusbabek, 1969:323.

VENEZUELAN RECORDS (13 females and 209 protonymphs):

Thirteen females and 203 protonymphs ex 48 *Tadarida gracilis;* 6 other protonymphs were from one collection each from a variety of bats and a rodent and may represent contaminations.

REMARKS

The above records represent an extension of the host range for this species. Radovsky (1967) pointed out that the greatest variation between type specimens and other specimens he examined was among specimens from *Tadarida femorosacca* in Arizona. The specimens from Venezuelan *Tadarida gracilis* agree well with the published descriptions of *C. venezolanus* and do not appear to represent any new or different taxa.

All but 13 of the specimens of *C. venezolanus* were collected in the southern portions of T. F. Amazonas and Apure at elevations ranging from 76-470 m. The majority were from around 200 m.

UNASSIGNED MATERIAL

Two specimens, a female ex *T. gracilis* and a protonymph ex *T. brasiliensis,* could not be placed with confidence in any presently known species of *Chiroptonyssus.* These specimens may be aberrant or could represent new species. In the absence of an adequate series of specimens in which females are represented, it is inadvisable to describe new taxa at this time or to assign these specimens to a known taxon.

Genus *Draconyssus* Yunker and Radovsky

Draconyssus Yunker and Radovsky, 1966:93.

Type Species: *Draconyssus belgicae* Yunker and Radovsky, 1966.

"With two dorsal shields or with a single prosomal shield and a cluster of pygidial platelets; second cheliceral segment extremely elongate, but not attenuate, at rest deeply withdrawn into idiosoma; sternal plate with two pairs of setae; metasternal setae absent; epigynial setae off plate; peritreme extending to level of middle of coxa II. Male unknown." (Yunker and Radovsky, 1966:93).

REMARKS

Draconyssus possesses morphological features which relate it to both the Dermanyssidae and the Macronyssidae: It has the long second cheliceral segment characteristic of dermanyssid mites, but the chelae are strong as in the macronyssid mites (rather than minute as in dermanyssid mites). Yunker and Radovsky (1966) remarked, "At this point we are unable to assign *Draconyssus* to a subfamily within the Dermanyssidae. We suspect it to be a macronyssid and to have affinities with *Ophionyssus* and *Sauronyssus*." Therefore, I have included *Draconyssus* in this paper.

Draconyssus belgicae Yunker and Radovsky

Draconyssus belgicae Yunker and Radovsky, 1966:93.

VENEZUELAN RECORDS (3 females):

Three females ex 3 "lizards." Two of the 3 specimens were collected in Trujillo (90 m) and the other in Falcon (90 m).

REMARKS

Venezuelan specimens closely agree with the type material from Panama. Yunker and Radovsky (1966) reported considerable variation in features of the dorsal and ventral plates in the type material from Panama, but inasmuch as only 3 specimens were collected in Venezuela, there was no opportunity to study variation there. Had more attention been given to the collection of intranasal mites of lizards, it is probable that more specimens of *D. beligicae* would have been available for study.

Genus *Lepidodorsum* Saunders and Yunker

Lepidodorsum Saunders and Yunker, 1975:756-759.

Type Species: *Lepidodorsum tiptoni* Saunders and Yunker, 1975.

Macronyssid mites of moderate to small size (adult 500-600 μ long). Dorsal plate entire, elongate-ovate, ornamented with scale-like pattern forming small cells over most of plate (each cell, except those of plate margins, containing many small punctae). Dorsal plate with 15-17 pairs of barbed setae; unarmed integument hypertrichous. Sternal plate short, with only two pairs of sternal setae; St3 absent. Epigynial plate long, narrow, and with membranous anterior flap extending over sternal plate to base of tritosternum. Idiosomal setae of moderate length, some piliform, and most barbed. Peritreme long, narrow, terminating over coxa II; peritremal plate fused with dorsal plate anteriorly. All coxae with definite sculpturing but lacking ventral spurs or ridges. Legs normal, without any striking modification. Chelicerae slender, rather long; chelae simple, endendate, without setae. Palpal trochanter without ventral spur.

Male: Unknown.

Protonymph: Unknown.

Lepidodorsum tiptoni Saunders and Yunker

Lepidodorsum tiptoni Saunders and Yunker, 1975:756-759.

VENEZUELAN RECORDS (23 females):

Of the 23 females collected, 22 were off 6 *Oryzomys albigularis*, the type host. The single remaining specimen, in poor condition, was off *Zygodontomys brevicauda*.

REMARKS

This genus and species is similar to *Ornithonyssus* but differs from it in the following important aspects: (1) sternal setae 3 absent, (2) palpal trochanter without ventral spur, (3) anal plate enlarged, (4) epigynial plate with prolonged anterior projection, and (5) peritremal plate fused anteriorly with dorsal plate.

Genus *Ornithonyssus* Sambon

Ornithonyssus Sambon, 1928:105; Strandtmann and Wharton, 1958:81; Furman and Radovsky, 1963:90 (Rediagnosis).

Type Species: *Dermanyssus sylviarum* Canestrini and Fanzago, 1878.

All setae slender and many, particularly posterior ones, barbed (single barb usually). Dorsal plate generally entire, frequently leaving large area of idiosoma exposed. Legs moderately long and slender. Coxae without prominent ridges or spurs; anteromarginal spur of coxa II small.

REMARKS

This genus was the most prevalent among the macronyssid mites collected in Venezuela, due primarily to the large numbers of *Ornithonyssus bacoti*.

Ornithonyssus bacoti (Hirst)

Leiognathus bacoti Hirst, 1913:122.

Ornithonyssus bacoti Bregetova, 1956:165; Strandtmann and Wharton, 1958:83; Strandtmann, 1956:137; Baker, *et al.*, 1956: 22.

VENEZUELAN RECORDS (218 females, 222 males, 1243 protonymphs, and 1 larva):

Thirty-four females, 24 males, and 429 protonymphs ex 116 *Zygodontomys brevicauda;* 45 females, 54 males, and 226 protonymphs ex 100 *Sigmodon hispidus;* 50 females, 72 males, and 222 protonymphs ex 94 *Proechimys semispinosus*; 21 females, 13 males, and 101 protonymphs ex 26 *Sigmomys alstoni;* 18 females, 5 males, and 95 protonymphs ex 19 *Rattus rattus;* 1 female, 25 males, and 34 protonymphs ex 13 *Proechimys guyannensis.* Other hosts from which *O. bacoti* was collected included 9 *Holochilus brasiliensis*, 5 *Marmosa robinsoni*, and 5 *Monodelphis brevicaudata.* Mammals infested with this species 3 or 4 times were *Didelphis marsupialis, Echimys semivillosus, Rhipidomys macconnelli, Nectomys squamipes, oryzomys fulvescens,* and *Akodon urichi.* The remaining 33 species of rodents, bats, marsupials, and birds from which specimens were recorded may be work table contaminations or accidental infestations.

REMARKS

The specimens of *O. bacoti* taken in Venezuela agree well with descriptions of the species. Yunker and Radovsky (1966) found *Sigmodon hispidus* to be a more common host of *O. bacoti* than *Zygodontomys brevicauda* in Panama, while the reverse was true in Venezuela, although both species were frequently infested.

The tropical rat mite is one of the most cosmopolitan of all parasitic mesostigmatid mites. It was first described from Egypt but has since been found worldwide in association with man and his domiciliated animals, particularly rodents. *O. bacoti* is found primarily on house rats, but is common on many other species of rodents, and can attack birds and many mammals other than rodents, including man.

Strandtmann and Wharton (1958) expressed the view that *O. bacoti* originated in the New World as a parasite of *Sigmodon hispidus* and secondarily became associated with species of *Rattus* on which it has spread throughout the world.

Ornithonyssus bursa (Berlese)

Leiognathus bursa Berlese, 1888:208.

Ornithonyssus bursa Sambon, 1928:107; Strandtmann and Wharton, 1958:86.

Venezuelan Records (12 females, 1 male, and 6 protonymphs):

Eleven females, 1 male, and 6 protonymphs ex 2 "birds," 1 female ex *Desmodus rotundus.* The latter record is probably the result of work table contamination.

Remarks

The fact that this species was taken from only three hosts in Venezuela probably does not reflect its prevalence but rather indicates that very few birds were sampled for ectoparasites.

Ornithonyssus wernecki (Fonseca)

Liponyssus wernecki Fonseca, 1935b:74.

Ornithonyssus wernecki Furman and Radovsky, 1963:91.

Venezuelan Records (39 females, 20 males, and 16 nymphs):

Thirty-eight females, 20 males, and 7 nymphs ex 9 *Didelphis marsupialis;* 1 female and 9 nymphs ex 2 *Lutreolina crassicaudata.*

Remarks

As noted by Strandtmann and Wharton (1958), *O. wernecki* is most commonly found on marsupial hosts. In the Venezuelan material, all collections were off marsupials. *O. wernecki* can be separated from *O. bacoti* by the presence of a spurlike elevation on coxa I, from which the proximal seta arises, and by its host associations. *O. bacoti* is found primarily on rodent hosts while *O. wernecki* is found on marsupials.

HOST-PARASITE LIST[*]

(Smithsonian Venezuelan Project Collection)

Class Reptilia

I. Order Squamata
  A. Family
    1. *Draconyssus belgicae* 3[**]

Class Aves

II. Order
  A. Family
    1. "Bird"
      a. *Ornithonyssus bursa* 2
      b. *Pellonyssus sp.* 2

Class Mammalia

III. Order Marsupialia
  A. Family Didelphidae
    1. Monodelphis brevicaudata
      a. *Ornithonyssus bacoti* 5
    2. *Marmosa robinsoni*
      a. *Ornithonyssus bacoti* 5
    3. *Didelphis marsupialis*
      a. *Ornithonyssus bacoti* 3
      b. *Ornithonyssus wernecki* 9
    4. *Lutreolina crassicaudata*
      a. *Ornithonyssus wernecki* 2

IV. Order Chiroptera
  A. Family Emballonuridae
    1. *Saccopteryx bilineata*
      a. *Parichoronyssus cryptosternum* 1
    2. *Peropteryx macrotis*
      a. *Radfordiella* n. sp., nr. *carolliae* 6
      b. *Radfordiella* sp. 1
  B. Family Noctilionidae
    1. *Noctilio labialis*
      a. *Macronyssus crosbyi* 1
      b. *Parichoronyssus euthysternum* 1
      c. *Parichoronyssus oudemansi* 1
      d. *Steatonyssus* sp. 1
      e. New Genus "N" n. sp. #1 2
      f. New Genus "N" n. sp. #2 2
  C. Family Phyllostomidae
    1. *Lonchorhina aurita*
      a. *Radfordiella oudemansi* 1
      b. *Radfordiella* sp. 1
    2. *Tonatia brasiliensis*
      a. *Radfordiella* sp. 1
    3. *Phyllostomus hastatus*
      a. *Radfordiella oudemansi* 2
      b. *Parichoronyssus* sp. 1
      c. *Parichoronyssus* n. sp., not *sclerus* 3
      d. *Parichoronyssus* n. sp. #1 6
    4. *Phylloderma stenops*
      a. *Macronyssus meridionalis* 1
      b. *Radfordiella oudemansi* 2
      c. *Radfordiella* n. sp., nr. *oudemansi* 1
    5. *Trachops cirrhosus*
      a. *Macronyssus meridionalis* 1

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[*] An attempt has been made to eliminate those collections considered erroneous or accidental association.

[**] The number of hosts from which collections of each species of parasite were made

6. *Glossophaga soricina*	
a. *Macronyssoides kochi*	1
7. *Lionycteris spurrelli*	
a. *Parichoronyssus* n. sp., not *sclerus*	2
b. *Radfordiella* n. sp.	6
8. *Lonchophylla robusta*	
a. *Chirocetes lonchophylla*	1
9. *Anoura geoffroyi*	
a. *Parichoronyssus* sp.	1
10. *Choeroniscus godmani*	
a. *Macronyssus* sp.	1
11. *Carollia perspicillata*	
a. *Chiroptonyssus haematophagus*	1
b. *Macronyssoides kochi*	6
c. *Parichoronyssus crassipes*	1
d. *Parichoronyssus* n. sp., not *sclerus*	1
e. *Radfordiella carolliae*	4
f. *Radfordiella desmodi*	2
12. *Carollia brevicauda*	
a. *Parichoronyssus euthysternum*	1
b. *Radfordiella carolliae*	2
13. *Carollia* sp.	
a. *Parichoronyssus euthysternum*	1
b. *Parichoronyssus* sp., nr. *euthysternum*	1
c. *Radfordiella carolliae*	5
d. *Radfordiella* sp.	4
14. *Sturnira erythromos*	
a. *Macronyssoides* sp.	2
b. *Macronyssus* sp.	1
15. *Sturnira lilium*	
a. *Chiroptonyssus haematophagus*	1
b. *Macronyssus* n. sp. #1	1
c. *Parichoronyssus euthysternum*	
d. *Parichoronyssus* sp., nr. *euthysternum*	3
e. *Radfordiella* sp.	1
16. *Sturnira ludovici*	
a. *Chiroptonyssus robustipes*	1
b. *Parichoronyssus euthysternum*	1
c. *Parichoronyssus* sp.	2
17. *Uroderma bilobatum*	
a. *Macronyssoides kochi*	1
18. *Vampyrops aurarius*	
a. *Macronyssoides conciliatus*	7
b. *Macronyssus* sp., nr., but not, *unidens*	1
19. *Vampyrops helleri*	
a. *Macronyssoides kochi*	9
b. *Macronyssoides* sp.	1
c. *Parichoronyssus* n. sp. #2	1
d. *Radfordiella oudemansi*	1
20. *Vampyrops umbratus*	
a. *Macronyssoides conciliatus*	6
b. *Macronyssoides kochi*	1
c. *Parichoronyssus* sp., nr. *euthysternum*	1
21. *Artibeus cinereus*	
a. *Macronyssoides kochi*	2
22. *Artibeus* concolor	
a. *Parichornyssus* sp., near n. sp. #2	1
23. *Artibeus fuliginosus*	
a. *Macronyssoides kochi*	1
24. *Artibeus jamaicensis*	
a. *Macronyssoides kochi*	80
b. *Chiroptonyssus venezolanus*	1
25. *Artibeus lituratus*	
a. *Macronyssoides kochi*	8
26. *Desmodus rotundus*	
a. *Chiroptonyssus venezolanus*	1
b. *Macronyssoides kochi*	1
c. *Macronyssus* n. sp. #1	5
d. *Parichoronyssus* n. sp. #1	1
e. *Parichoronyssus* n. sp., not *sclerus*	1
f. *Radfordiella desmodi*	76
g. *Radfordiella* sp.	1
27. *Desmodus youngi*	
a. *Radfordiella desmodi*	1
b. *Radfordiella oudemansi*	6
c. *Nycteronyssus desmodus*	1
28. *Desmodus sp.*	
a. *Radfordiella desmodi*	1
D. Family Vespertilionidae	
1. *Myotis albescens*	
a. *Macronyssus crosbyi*	2
b. *Macronyssus* sp.	2
c. *Steatonyssus joaquimi*	1
2. *Myotis nigricans*	
a. *Chiroptonyssus venezolanus*	1
b. *Macronyssus meridionalis*	9
c. *Macronyssus* sp., nr. *crosbyi*	1
3. *Myotis* sp.	
a. *Macronyssus* sp., nr. *crosbyi*	1
4. *Eptesicus brasiliensis*	
a. *Macronyssus* sp., nr., but not, *sclerus*	13
b. *Macronyssus* sp., nr. *crosbyi*	1
c. *Macronyssus* sp., nr. *longisetosus*	1
d. *Macronyssus* sp.	4
e. *Steatonyssus* sp.	3

- 5. *Eptesicus fuscus*
  - a. *Steatonyssus occidentalis* 1
- 6. *Eptesicus* sp.
  - a. *Macronyssus* sp., nr., but not, *unidens* 1
  - b. *Steatonyssus occidentalis* 1
  - c. *Steatonyssus* sp. 3
- 7. *Histiotus* sp. A.
  - a. *Cryptonyssus* sp. 1
- 8. *Lasiurus ega*
  - a. *Steatonyssus radovskyi* 1

E. Family Molossidae

- 1. *Molossops planirostris*
  - a. *Chiroptonyssus venezolanus* 1
- 2. *Tadarida brasiliensis*
  - a. *Chiroptonyssus robustipes* 2
  - b. *Chiroptonyssus* sp., not *robustipes* 1
- 3. *Tadarida gracilis*
  - a. *Chiroptonyssus haematophagus* 3
  - b. *Chiroptonyssus venezolanus* 48
  - c. *Chiroptonyssus* sp. 1
- 4. *Molossus ater*
  - a. *Chiroptonyssus haematophagus* 29
  - b. *Parichoronyssus* n. sp. #1 1
  - c. New Genus "N" n. sp. #2 15
- 5. *Molossus aztecus*
  - a. *Chiroptonyssus haematophagus* 3
- 6. *Molossus bondae*
  - a. *Chiroptonyssus haematophagus* 5
  - b. New Genus "N" n. sp. #2 3
- 7. *Molossus molossus*
  - a. *Chiroptonyssus haematophagus* 11
  - b. New Genus "N" n. sp. #2 1
- 8. *Molossus sinaloae*
  - a. *Chiroptonyssus haematophagus* 1
- 9. *Molossus* sp.
  - a. *Chiroptonyssus haematophagus* 1
- 10. *Promops* sp.
  - a. *Chiroptonyssus haematophagus* 1

V. Order Rodentia

A. Family Sciuridae

- 1. *Sciurus granatensis*
  - a. *Acanthonyssus proechimys* 1

B. Family Heteromyidae

- 1. *Heteromys anomalus*
  - a. *Acanthonyssus proechimys* 1

C. Family Muridae

- 1. *Oryzomys albigularis*
  - a. *Lepidodorsum tiptoni* 6
- 2. *Oryzomys bicolor*
  - a. *Argitis oryzomys* 1
- 3. *Oryzomys concolor*
  - a. *Ornithonyssus* n. sp. 1
  - b. *Ornithonyssus* sp., nr. *bacoti* 1
  - c. *Argitis oryzomys* 1
- 4. *Oryzomys fulvescens*
  - a. *Ornithonyssus* sp. 1
  - b. *Ornithonyssus bacoti* 3
  - c. *Ornithonyssus* n. sp. 3
- 5. *Oryzomys minutus*
  - a. *Ornithonyssus* n. sp. 27
- 6. *Nectomys squamipes*
  - a. *Ornithonyssus bacoti* 3
- 7. *Rhipdomys couesi*
  - a. *Ornithonyssus bacoti* 1
- 8. *Rhipodmys leucodactylus*
  - a. *Ornithonyssus bacoti* 1
- 9. *Rhipidomys macconnelli*
  - a. *Ornithonyssus bacoti* 3
- 10. *Rhipidomys venezuelae*
  - a. *Ornithonyssus bacoti* 2
- 11. *Thomasomys laniger*
  - a. *Ornithonyssus* n. sp. 1
- 12. *Microxus bogotensis*
  - a. *Ornithonyssus* n. sp. 1
- 13. *Akodon urichi*
  - a. *Ornithonyssus* sp., nr. *bacoti* 1
  - b. *Ornithonyssus bacoti* 3
- 14. *Zygodontomys brevicauda*
  - a. *Ornithonyssus bacoti* 116
  - b. *Ornithonyssus* sp. 2
  - c. *Acanthonyssus proechimys* 1
  - d. *Lepidodorsum tiptoni* 1
- 15. *Holochilus brasiliensis*
  - a. *Ornithonyssus bacoti* 9
- 16. *Sigmodon hispidus*
  - a. *Ornithonyssus bacoti* 100
  - b. *Ornithonyssus* sp., nr. *bacoti* 1
  - c. *Acanthonyssus proechimys* 1
- 17. *Sigmomys alstoni*
  - a. *Ornithonyssus bacoti* 26
- 18. *Rattus rattus*
  - a. *Acanthonyssus proechimys* 1
  - b. *Ornithonyssus bacoti* 19
  - c. *Ornithonyssus* sp., nr. *bacoti* 1

D. Family Dasyproctidae

- 1. *Agouti paca*
  - a. *Ornithonyssus* sp., nr. *bacoti* 2

2. *Dasyprocta aguti*
    a. *Ornithonyssus bacoti* 1

E. Family Echimyidae
  1. *Proechimys guyannensis*
    a. *Acanthonyssus proechimys* 10
    b. *Ornithonyssus bacoti* 13
  2. *Proechimys semispinosus*
    a. *Acanthonyssus proechimys* 118
    b. *Ornithonyssus bacoti* 94
  3. *Echimys semivillosus*
    a. *Ornithonyssus bacoti* 3

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SYSTEMATICS OF NEOTROPICAL *HIRSTIONYSSUS* MITES WITH SPECIAL EMPHASIS ON VENEZUELA (ACARINA: MESOSTIGMATA)

by

C. Selby Herrin[1] and Conrad E. Yunker[2]

ABSTRACT

This paper presents the results of a systematic study of mites of the genus *Hirstionyssus* Fonseca collected from mammals, primarily in Venezuela, but including one collection each from Colombia, Nicaragua, and British Honduras. Previously described species from Panamá and Brazil are reviewed and new distributional records are listed. The known Neotropical fauna of *Hirstionyssus* mites includes 15 species, 7 of which are described here as new: *H. proctolatus* n. sp.; *H. brachysternum* n. sp.; *H. dorsolatus* n. sp.; *H. rhipidomys* n. sp.; *H. venezuelensis* n. sp.; *H. brevicalcar* n. sp.; and *H. parvisoma* n. sp. The previously unknown male and deutonymph of *H. keenani* Strandtmann and Yunker are described, and new collection records are given for *H. heteromydis* Strandtmann and Yunker, *H. keenani* Strandtmann and Yunker, *H. butantanensis* Fonseca, and *H. galindoi* Strandtmann and Yunker. A key for identification of females and males of Neotropical *Hirstionyssus* is given and 9 species are illustrated. Collection data are provided for each species and, where pertinent, discussions of morphological characters and variability are provided.

INTRODUCTION

This study of *Hirstionyssus* is based primarily on mites collected from mammals in Venezuela between July 1965 and August 1968 by the Smithsonian Venezuela Project. Field groups headed by Messrs. N. E. Peterson, M. D. Tuttle, and A. L. Tuttle collected the hosts and ectoparasites. Dr. Charles O. Handley, Jr., Smithsonian Institution, identified the hosts. Also included in the study are single collections from Colombia (N. E. Peterson, collector), Nicaragua (Rocky Mountain Laboratory, J. K. Jones, collector), and British Honduras (British Museum, Natural History, D. J. Lewis, collector). Prior to this study the only published reports of *Hirstionyssus* mites from Central and South America were those of Fonseca (1932), who described *H. butantanensis* from white laboratory mice in Brazil, and Strandtmann and Yunker (1966), who described seven new species from Panamá mammals. Objectives of this study are to clarify the systematics of Neotropical *Hirstionyssus* mites and to provide data on host-parasite relationships.

The concepts of the family Laelapidae Berlese, 1892, the subfamily Hirstionyssinae Evans and Till, 1966, and the genus *Hirstionyssus* Fonseca, 1948, are essentially those of Radovsky (1966, 1967, 1969), Evans and Till (1966), and Herrin (1970). The morphological terminology and chaetotactic signatures are basically from Evans and Till (1965, 1966).

Measurements of specimens were made as follows: the dorsal shield was measured at the midline, and the greatest width was used; the peritreme was measured in a straight line from the posterior of the stigma to the anterior end of the peritreme; the length of the sternal shield of females and deutonymphs was measured at the midline, and the holoventral shield of males was measured from setae st. 1 to the postanal seta; the width of the sternal shield of females and deutonymphs and the anterior width of the male holoventral shield was measured between setae st. 1 and st. 2; the genital shield length was measured from the genital setae to the posterior end, and the width was measured just posterior to the genital seta; the anal shield length of females and deutonymphs was measured from the anterior margin to the postanal seta, and the greatest width was measured at or near the middle of the anal field.

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For each of the new species described, the holotype, allotype (where known), and one or more paratypes will be deposited in the U.S. National Museum of Natural History, Washington, D.C. Paratypes will go to the Rocky Mountain Laboratory, the Universidad Central de Venezuela, Caracas, and the collection of the senior author.

We gratefully acknowledge the assistance of the many people associated with this study. Special thanks is given to Dr. Vernon J. Tipton, director of the Center for Health and Environmental Studies, Brigham Young University, and Dr. Charles O. Handley, Jr., Smithsonian Institution for logistic support. Mr. Robert C. Saunders made preliminary identification of some of the Venezuela material. Illustrations were prepared by Miss Sheila E. Ford and Mrs. Jeanne N. Thomas. We are grateful to the Rocky Mountain Laboratory for loan of the Nicaragua collection and paratypes of the Panamá species; and to the British Museum, Natural History (Mr. K. H. Hyatt, curator), for loan of the specimens from British Honduras. The Center for Health and Environmental Studies provided laboratory space and equipment.

TAXONOMY

Family Laelapidae Berlese, 1892

Subfamily Hirstionyssinae Evans and Till, 1966

Genus Hirstionyssus Fonseca, 1948

Type-species: *Hirstionyssus talpae*
Zemskaya, 1955

Fifteen species of *Hirstionyssus* are known to inhabit the Neotropical region. Nine species are recorded here from Venezuela. These include *H. butantanensis* Fonseca, two of the seven species described from Panamá by Strandtmann and Yunker (1966), and six species described as new in this paper. In addition there are descriptions of another new species from Nicaragua and of the previously unknown male and deutonymph of *H. keenani* Strandtmann and Yunker.

Diagnoses, descriptions, illustrations, and collection data are presented for each of the new species and for two previously described species. The species treatments are arranged in the same order as that presented in the key to females, which reflects the phenetic relationships of the various species.

The following keys to Neotropical *Hirstionyssus* include females of all known species and males of 11 of the 15 species. Males of *H. panamensis*, *H. microchelae*, *H. dorsolatus* n. sp., and *H. galindoi* remain unknown and undescribed.

Since deutonymphs of only 7 of the 15 species have been described, and because of the great difficulty in finding reliable discrete characters by which they can be separated, no key to the deutonymphs is presented here.

Key to Neotropical species of *Hirstionyssus*

Females

1. Coxal spur formula 0-3-2-2; trochanters III and IV and femora III and IV with row of cuticular spurlike processes on their distal margins; anal shield wider than long, somewhat bellshaped, and laterally angulate 2

Coxal spur formula variable but never 0-3-2-2; without spurlike cuticular processes on any free leg segments; anal shield variable but never extremely wide, bellshaped, and laterally angulate 3

2(1). Posterior margin of sternal shield moderately concave medially (invaginated to level of setae st. 2); setae of coxae II and III acutely spiniform; ventral opisthosomal setae and dorsal opisthosomal setae on soft integument short and spiniform; setae of dorsal shield minute .... *H. lunatus* Strandtmann and Yunker

Posterior margin of sternal shield only slightly concave; only anterior seta of coxa III acutely spiniform, all other coxal setae piliform; all ventral and dorsal body setae normal, not short and spiniform, setae of dorsal shield medium in size, never minute. (Fig. 1-2) .... *H. proctolatus* n. sp. (p. 6)

3(1). Coxa II with large, broadly rounded ventral spur and with broad ridge on posterior margin; posterior margin of sternal shield slightly convex to slightly concave 4

Coxa II with ventral spur variable but not large and broadly rounded, and without broad ridge on posterior margin (however, a distinct posteromarginal spur may be present); posterior margin of sternal shield slightly concave to deeply concave (invaginated from level of setae st. 3 to level of first pair of pores) 6

4(3). Posterior margin of sternal shield slightly convex to sinuous; genital shield relatively narrow and narrowly rounded posteriorly; coxa IV without spur .... *H heteromydis* Strandtmann and Yunker (p. 8)

Posterior margin of sternal shield slightly concave (invaginated to level of setae st. 3); genital shield not unusually narrow; genital shield broadly rounded posteriorly; coxa IV with spur 5

5(4). Dorsal setae extremely minute; sternal shield less than twice as wide as long; spurs of coxae III and IV small; anal shield circular .... *H. minutus* Strandtmann and Yunker

Dorsal setae medium in size; sternal shield more than twice as wide as long; spurs of coxae III and IV medium to large; anal shield pyriform .... *H. panamanensis* Strandtmann and Yunker

6(3). Posterior margin of sternal shield moderately to very deeply concave (invaginated from level of setae st. 2 to level of first pair of pores); ventral spurs of coxae II and III medium to large and usually acute (medium-sized spurs may be blunt); setae av_1 and pv_1 of tarsus II stout and clawlike and/or setae av_1 of tarsus IV bluntly or acutely spiniform 7

Posterior margin of sternal shield slightly to moderately concave (invaginated from level of setae st. 3 to level of setae st. 2); spur of coxa II (when present) small and narrowly to broadly rounded; setae av_1 and pv_1 of tarsus II never stout and clawlike, and setae av_1 of tarsus IV never spiniform 11

7(6). Setae av_1 and pv_1 of tarsus II normal, not stout and clawlike; setae av_1 of tarsus IV acutely or bluntly spiniform; coxa IV with medium-sized acute spur; posterior margin of sternal shield deeply concave (invaginated almost to level of first pair of pores) 8

Setae av_1 and pv_1 of tarsus II stout and clawlike; setae av_1 of tarsus IV not spiniform, at most slightly enlarged basally; coxa IV with or without spur; posterior margin of sternal shield moderately to rather deeply concave (invaginated from level of setae st. 2 to level halfway to first pair of pores) 9

8(7). Without distinct posteromarginal spur on coxa II; setae av_1 of tarsus IV bluntly spiniform; sternal setae st. 2 set distinctly closer to st. 3 (distance between st. 1 and st. 2 almost twice that between st. 2 and st. 3). (Fig. 6-8) .... *H. keenani* Strandtmann and Yunker (p. 9)

With elongate, blunt posteromarginal spur on coxa II; setae av_1 of tarsus IV acutely spiniform; sternal setae st. 2 only slightly closer to st. 3 than to st. 1. (Fig. 14-16) .... *H. brachysternum* n. sp. (p 12)

9(7). Posterior margin of sternal shield rather deeply concave (invaginated to level halfway between setae st. 2 and first pair of pores); setae JvI set on posterolateral margin of genital shield; coxa IV without spur; dorsal setae r2 and s3 absent; posterior end of dorsal shield broadly rounded. (Fig. 20-22) ... *H. dorsolatus* n. sp. (p. 15)

Posterior margin of sternal shield moderately concave (invaginated from level of setae st. 2 to level slightly anterior to setae st. 2); setae JvI not set on margin of genital shield, at most only touches margin; coxa IV with or without spur; all 26 pairs of dorsal setae present and medium sized; posterior end of dorsal shield narrowly rounded or broad, bluntly wedge shaped 10

10(9). Coxa IV without spur; ventral spur of coxa II small and blunt; greatest width of dorsal shield at level of setae s4, with lateral sides converging posteriorly; posterior end of dorsal shield narrowly rounded; anal shield broadly pyriform. (Fig. 23-25) .... *H. rhipidomys* n. sp. (p. 17)

Coxa IV spur long and slender; ventral spur of coxa II medium sized and acute; greatest width of dorsal shield at level of setae Z1, with lateral sides slightly converging anteriorly; posterior end of dorsal shield broad, bluntly wedge shaped; anal shield narrowly pyriform .... *H. butantanensis* (Fonseca) (p. 20)

11(6). Posterior margin of sternal shield only slightly concave (invaginated from level of setae st. 3 to level of second pair of pores); posterolateral projections of sternal shield weak, slender, and attached or unattached to margin of shield; anal shield broadly pyriform to near circular 12

Posterior margin of sternal shield moderately concave (invaginated from level of second pair of pores to level of setae st. 2); posterolateral projections of sternal shield robust (may be slender), and always attached to margin of shield; anal shield narrowly to broadly pyriform 14

12(11). Coxa IV with medium-sized, broad, acute spur; anal shield almost circular; posterolateral projections of sternal shield slender, attached to margin of shield; spurs of coxae II and III medium sized and rather broadly rounded; chelicerae long and slender, with movable chela at most one-sixth the length of second cheliceral segment .... *H. microchelae* Strandtmann and Yunker

Coxa IV without spur; anal shield broadly pyriform; posterolateral projections of sternal shield weak and detached from margin of shield; spurs of coxae II and III variable; chelicerae normal, movable chela at least one-third as long as second cheliceral segment 13

13(12). Coxa II without ventral spur or at most with broad indistinct apophysis; sternal shield less than three times as wide as long; greatest width of dorsal shield at level of setae s4, with lateral sides converging posteriorly. (Fig. 29-30) .... *H. venezuelensis* n. sp. (p. 20)

Coxa II with small to medium-sized and narrowly rounded ventral spur; sternal shield more than three times as wide as long; lateral sides of dorsal shield nearly parallel (may be slightly wider at level of setae Z1). (Fig. 36-37) .... *H. brevicalcar* n. sp. (p. 24)

14(11). Coxa II without ventral spur or at most with medium-sized broad apophysis; ventral setae Jv1 on posterolateral margins of genital shield; movable chela one-half as long as second cheliceral segment; larger size. (Fig. 43-44) .... *H. galindoi* Strandtmann and Yunker (p. 28)

Coxa II with distinct ventral spur, small to medium sized, and narrowly rounded; ventral setae Jv1 not on margin of genital shield, but separated from margin by distance greater than setal base diameter; movable chela less than one-half as long as second cheliceral segment; smaller size. (Fig. 47-48) . *H. parvisoma* n. sp. (p. 30)

Males

1. Coxal spur formula always 0-3-2-1; coxa II with distinct posteromarginal spur in addition to usual ventral spur 2

Coxal spur formula usually 0-2-2-1 or 0-1-2-1 (except in *H. brachysternum* which may have posteromarginal spur on coxa II); coxa II without distinct posteromarginal spur (except possibly in *H. brachysternum*) and with or without usual ventral spur 5

2(1). Anal portion of holoventral shield greatly expanded laterally, with cribrum subtending posterior margin as a crescentic band; ventral spur of coxa II medium sized and acute to blunt 3

Anal portion of holoventral shield normal, not greatly expanded, and with narrow terminal cribrum; ventral spur of coxa II large and very broadly rounded to truncate 4

3(2). Twenty-eight pairs of minute setae on dorsal shield; setae of coxae II and III acutely spiniform .... *H. lunatus* Strandtmann and Yunker

Thirty-two or 33 pairs of medium-sized setae on dorsal shield; only anterior seta of coxa II acutely spiniform. (Fig. 3-5) .... *H. proctolatus* n. sp. (p. 6)

4(2). Holoventral shield very narrow posterior to coxa IV (width less than distance between coxae IV); shield markedly constricted anterior to anal portion (width less than or equal to distance between setae Jv2) .... *H. heteromydis* Strandtmann and Yunker (p. 8)

Holoventral shield moderately expanded posterior to coxa IV (width greater than distance between coxae IV); shield not markedly constricted anterior to anal portion (width greater than distance between setae Jv2) .... *H. minutus* Strandtmann and Yunker

5(1). Ventral spurs of coxae II and III medium sized and acute; dorsal shield with no more than three setae of R series on posterolateral margins 6

Ventral spur of coxa II absent or at most small and rounded; ventral spur of coxa III small to medium sized and acute to rounded; dorsal shield with more than 3 setae (usually 6 to 16) of R series on posterolateral margins 9

6(5). Dorsal shield with three pairs of setae of R series on posterolateral margins. (Fig. 17-19) .... *H. brachysternum* n. sp. (p. 12)

Dorsal shield without or at most with one pair of setae of R series on posterolateral margins 7

7(6). Posterior end of dorsal shield broad, blunt, wedge shaped; only two setae of r series (r2 and r3) on anterolateral margins; no setae of R series on posterolateral margins. (Fig. 9-11) .... *H. keenani* Strandtmann and Yunker (p. 9)

Posterior end of dorsal shield rather broadly rounded; two or three setae of r series (r2, r3, and frequently r4) on anterolateral margins; at most only one pair of setae of R series on posteromarginal margins 8

8(7). Dorsal setae S3 absent; with three pairs of setae of r series (r2, r3, and r4) on anterolateral margins; no setae of R series on posterolateral margins; lateral margins of dorsal shield nearly straight, with greatest width at level of setae s4; setae Z5 and S5 at least twice as long as central setae (J1, J2, and J3); holoventral shield moderately expanded posterior to coxa IV (width greater than distance between coxae IV). (Fig. 26-28) .... *H. rhipidomys* n. sp. (p. 17)

Dorsal setae S3 present, with two pairs of setae of r series (r2 and r3) on anterolateral margins; frequently with one pair of setae of R series on posterolateral margins; lateral margins of dorsal shield distinctly concave, with greatest width at level of setae S1; setae Z5 and S5 subequal in length to central setae; holoventral shield only slightly expanded posterior to coxa IV (width less than distance between coxae IV) .... *H. butantanensis* (Fonseca) (p. 20)

9(5). Coxal spur formula 0-2-2-1; ventral spur of coxa II small and rounded; holoventral shield very broad between coxae, with width posterior to coxa IV no greater than distance between coxae IV; greatest width of dorsal shield distinctly at level of setae s4, with lateral sides converging posteriorly; setae av_2 and av_3 of tarsus II normal, not basally enlarged. (Fig. 38-40) .... *H. brevicalcar* n. sp. (p. 24)

Coxal spur formula 0-1-2-1; ventral spur of coxa II absent; holoventral shield narrower between coxae, with width posterior to coxa IV greater than distance between coxae IV; lateral sides of dorsal shield straight to slightly concave and nearly parallel; setae av_2 and sometimes av_3 of tarsus II basally enlarged 10

10(9). Posterolateral margins of dorsal shield bears from 10 to 16 pairs of setae of R series; setae av_2 and av_3 both bulbous basally; movable chela half as long as second cheliceral segment; larger size. (Fig. 31-33) .... *H. venezuelensis* n. sp. (p. 20)

Posterolateral margins of dorsal shield bears from four to six pairs of setae of R series; seta av_2 of tarsus II greatly enlarged and almost spiniform, but seta av_3 normal; movable chela only one-third as long as second cheliceral segment; smaller size. (Fig. 49-51) .... *H. parvisoma* n. sp. (p. 30)

Subgenus *Hirstionyssus* Herrin, 1970

Hirstionyssus (*H.*) *proctolatus* n. sp. Fig. 1-5.

Diagnosis: The coxal spur formula for females is 0-3-3-2; all spurs are moderate in size and blunt to narrowly rounded. The most distinguishing character of both females and males is the broad, laterally angulate anal shield with small paranal setae. Other diagnostic characters of females are the row of cuticular spurlike processes on the distal margins of trochanters III and IV and on femora III and IV, and the generally truncate posterior margin of the sternal shield, with Jv1 setae on the posterolateral margins. In males the holoventral shield is very wide between the coxae and is expanded considerably posterior to coxa IV. The dorsal shield covers the entire dorsum.

Description, Holotype Female: Fig. 1-2.

Legs. Coxal spur formula 0-3-2-2; ventral spurs of coxae II and III medium sized (length 10-12 μm; basal width 7-8 μm) and blunt; posteromarginal spur of coxa II medium sized (length ca. 5 μm; basal width 8-10 μm) and blunt; posteromarginal spur of coxa III small (length 6-8 μm; basal width 5-6 μm) and blunt; anterior setae of coxa III robust and acutely spiniform; posteroventral spur of coxa IV small, broad, and blunt; additional broad, blunt spur on anteroventral margin of coxa IV. Trochanters III and IV and femora III and IV with row of four to six small cuticular spurlike processes on distal margins; lateroventral margins of genera III and IV serrated. Setae av_1 and pv_1 of tarsus II normal, not stout and clawlike; usual leg setae present and normal.

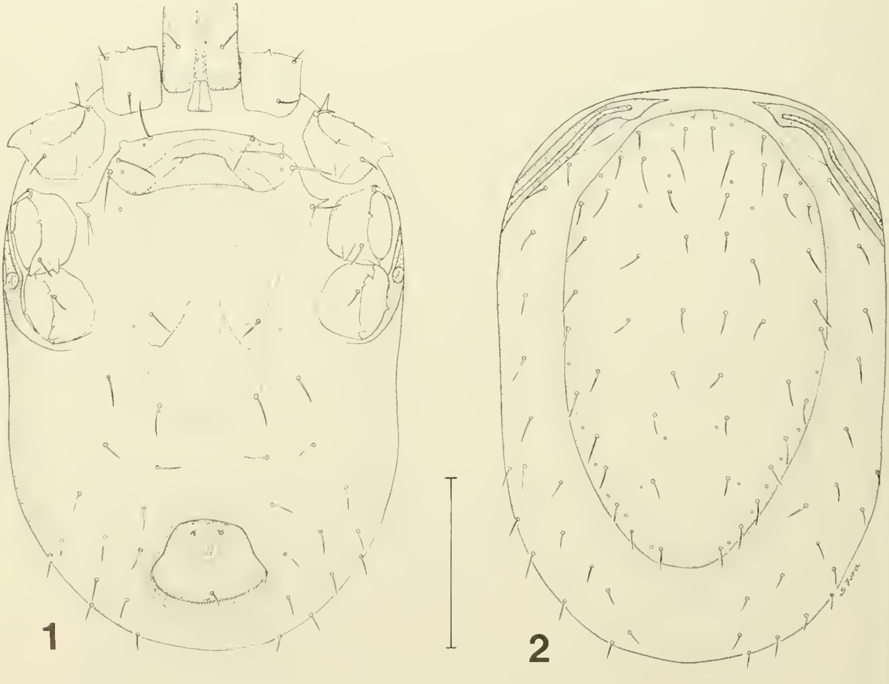

Fig. 1-2. *H. proctolatus* n. sp., female. (1) venter; (2) dorsum, scale = 100 μm.

Venter. Anterior margin of sternal shield moderately convex; posterior margin slightly concave (invaginated only to level posterior to setae st. 3); anterolateral projections short and broad; posterolateral projections long and narrow; sternal setae st. 2 very close to st. 3. Genital shield nearly rectangular; lateral sides only slightly convex and parallel; posterior margin only slightly convex; line formed by end of genital flap ribs moderately arched; Jv1 setae on posterolateral margin of genital shield. Anal shield broad, distinctly wider than long, with angulate lateral margins and short, broad cribrum; anal orifice located near anterior margin; paranal setae at level near anterior end of anal field. Soft integument of venter bears about 13 pairs of medium-sized (length 15-17 μm) opisthogastric setae. Peritreme of uniform width, except slightly wider posteriorly; extends anteriorly to level of posterior third of coxa I.

Dorsum. Greatest width of dorsal shield at level of setae s3 or s4; lateral margins slightly convex, converging posteriorly; posterior end narrowly rounded; 26 pairs of medium-sized (length 15-19 μm) normally developed setae.

Measurements. Dorsal shield length 281 μm; greatest width 164 μm. Peritreme length 133 μm. Sternal shield length 26 μm; width 86 μm. Genital shield length 60 μm; greatest width 74 μm. Anal shield length 41 μm; greatest width 59 μm. Length of tarsi: I - 46 μm; II - 45 μm; III - 43 μm; and IV - 50 μm. Length of movable chela 37 μm; length of second cheliceral segment 101 μm.

Allotype Male: Fig. 3-5.

Legs. Coxal spur formula 0-3-2-1; ventral spurs of coxae II and III small (lengths 5-6 μm; basal width 5-6 μm) and narrowly rounded; posteromarginal spur of coxa II small (length 2-4 μm; basal width 6-7 μm) and rather broadly rounded; posteromarginal spur of coxa III small to medium sized (length 7-8 μm; basal width 3-4 μm), slender, and acute; posteroventral spur of coxa IV small (length 5-6 μm; basal width 3-4 μm) and acute. Setae av_1 and pv_1 of tarsus II stout and clawlike; usual leg setae present and normally developed.

Venter. Holoventral shield broad throughout, filling entire venter between coxae; greatly expanded posterior to coxa IV; narrowed at level of paranal setae; and considerably expanded in anal area, with cribrum short and broad; bearing usual 4 pairs of sternal setae, 1 pair of genital setae, 3 pairs of opisthopastric setae (Zv1, Jv1, and Jv2), 1 pair of small paranal setae, and single postanal seta; paranal setae at level of anterior end of anal field. Soft integument of venter bears about 11 pairs of medium-sized (length 15-17 μm) opisthogastric setae. Peritreme rather narrow throughout although slightly wider posteriorly; extends anteriorly to level of middle of coxa I.

Dorsum. Dorsal shield covers almost entire dorsum; greatest width at level of setae s4; lateral sides nearly straight and gradually converging posteriorly; posterior end broadly rounded. Usual 26 pairs of dorsal setae present, as in females, plus first 3 setae of r series (r2, r3, and r4), and 3 or 4 pairs of setae of R series which, in females, are always on soft integument; all dorsal setae medium sized (length 10-12 μm).

Measurements. Dorsal shield length 378 μm; greatest width 234 μm. Peritreme length 176 μm. Holoventral shield length 274 μm; anterior width 102 μm; greatest width posterior to genital setae 117 μm; width at level of middle of anal field 94 μm. Length of tarsi: I - 66 μm; II - 62 μm; III - 70 μm; and IV - 70 μm. Length of movable chela 35 μm; length of second cheliceral segment 58 μm.

Deutonymph: Unknown.

Type Material: Holotype female, allotype male, one paratype female and one paratype male (SVP-42683) from *Heteromys anomalus*, El Rosario (54 m), 48 km WNW Encontrados, Zulia, Venezuela, April 1, 1968, by A. L. Tuttle, et al. One paratype female (SVP-14835) from *Carollia perspicillata*, nr. La Pastora (122 m), 14 km ENE Mirimiri, Falcón, Venezuela, November 11, 1967, by N. E. Peterson, et al. Additional material examined: one male (SVP-42680) with same collection data as holotype female. One female (281070-03) from *Oryzomys caliginosus*, Hda. El Nus, 11 km S and 30 km E Cisneros, Antióquia, Colombia, October 28, 1970, by N. E. Peterson.

Remarks: This species closely resembles *H. lunatus* Strandtmann and Yunker (1966) from Panamá, but differs in the following respects: ventral spurs of coxae II and III somewhat longer; anterior and posterior setae of coxae II normal, not acutely spiniform; all leg setae, ventral opisthogastric setae and dorsal opisthosomal setae normal, not short and spiniform; sternal shield smaller, shorter, and only slightly invaginated posteriorly; genital shield of female more rectangular in shape, and lateral sides and posterior margin less convex; in females posterior end of dorsal shield more narrowly rounded; dorsal setae of both sexes much longer; in female setae J1 present, and setae r2 separated from margin of dorsal shield. The principal

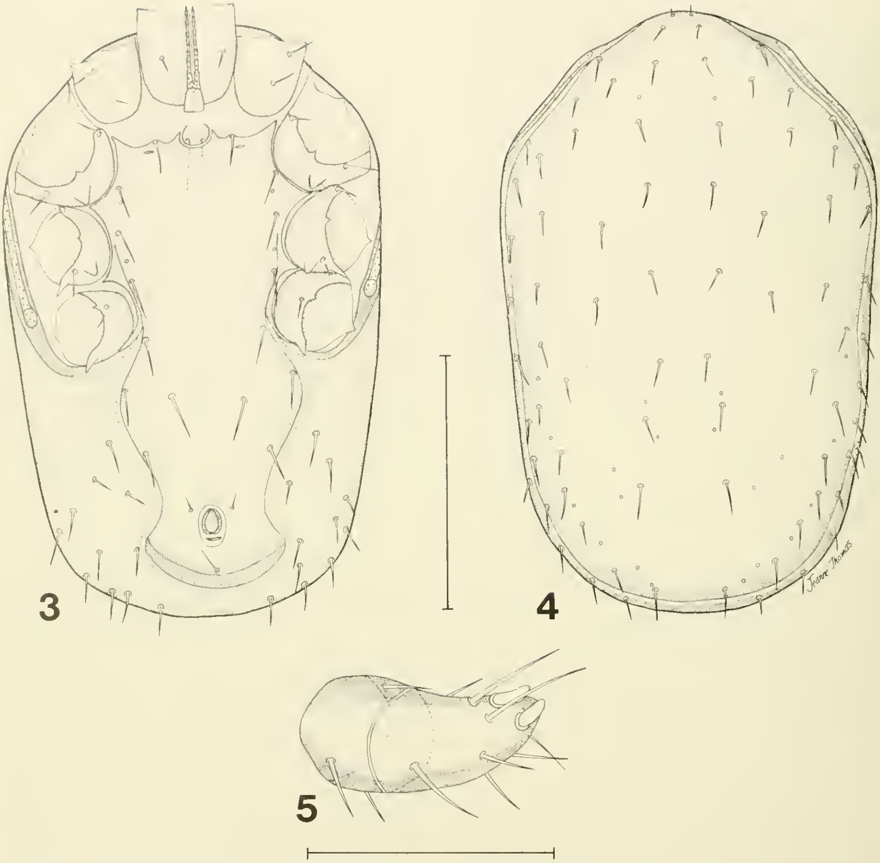

Fig. 3-5. *H. proctolatus* n. sp., male. (3) venter; (4) dorsum, scale = 100 μm; (5) ventral view of tarsus II, scale = 50 μm.

hosts of *H. lunatus* from Panamá and *H. proctolatus* of Venezuela are heteromyid rodents, *Heteromys desmarestianus* and *H. anomalus*, respectively. Strandtmann and Yunker (1966) reported six females and one male of *H. lunatus* from two collections of *H. desmarestianus* in Panamá. In the present study, two females and two males of *H. proctolatus* were taken from a single *Heteromys anomalus*. The one female specimen recorded from the bat, *Carollia perspicillata* may represent a laboratory contamination or confusion of labels.

Hirstionyssus (*H.*) *heteromydis* Strandtmann and Yunker, 1966.

The original descriptions and illustrations given by Strandtmann and Yunker (1966) are quite sufficient. Thus, only the new collection records for this species are presented here.

New Record: 11 females, 7 males, and 2 deutonymphs from *Heteromys* sp. (probably *H. desmarestianus*) at Cuacamallo, British Honduras, September 25, 1963, by D. J. Lewis (specimens loaned by the British Museum, Natural History). Previously known only from Panamá.

Hirstionyssus (*H.*) *keenani* Strandtmann and Yunker, 1966. Fig. 6-13.

A detailed description of the female will not be given here because the original description by Strandtmann and Yunker (1966) is adequate. However, a representative specimen from the Venezuela collection has been illustrated. Strandtmann and Yunker (1966) found no males in the Panamá material and, although they illustrated parts of a deutonymph, no description was given. Thus, descriptions and illustrations of the male and the deutonymph are given below. No significant differences were noted between the Venezuela specimens and paratypes from Panamá. Measurements of a female *H. keenani* from Venezuela are given for comparison with other closely related species described here.

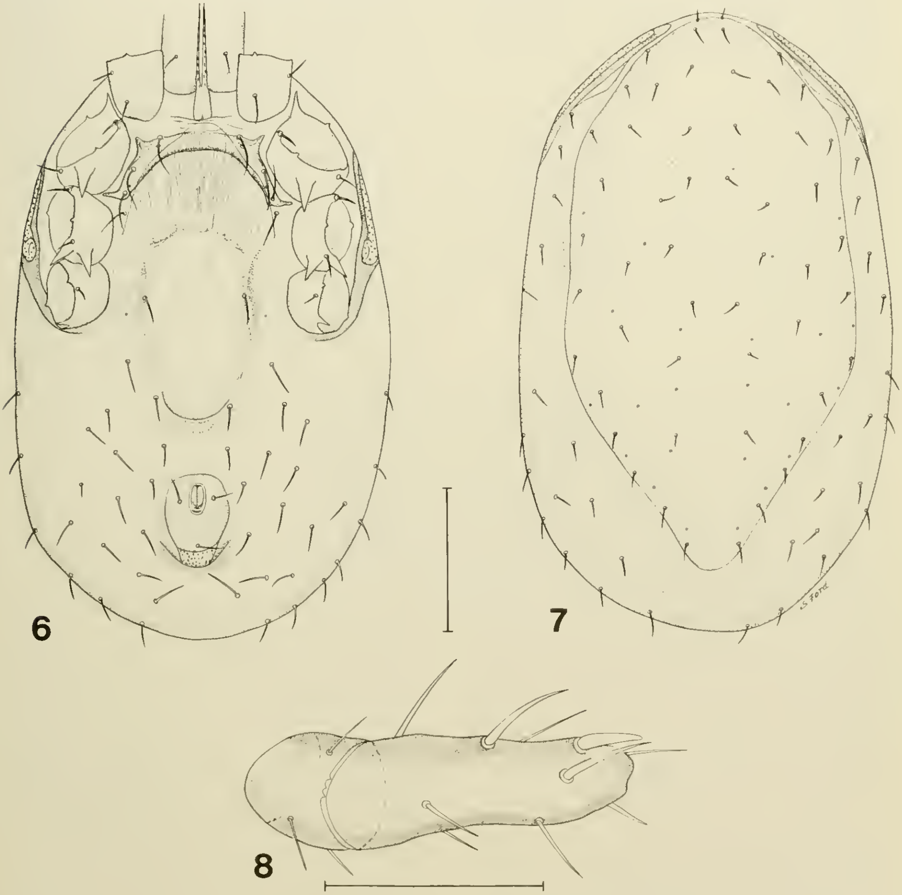

Fig. 6-8. *H. keenani* Strandtmann and Yunker, female. (6) venter; (7) dorsum, scale = 100 μm; (8) ventral view of tarsus IV, scale = 50 μm.

Diagnosis: The coxal spur formula for females and males is 0-2-2-1; all spurs are medium to large, slender, and acute, although larger in females than in males. Setae av_1 and pv_1 of tarsus II are stout and clawlike only in males. Seta av_1 of tarsus IV is bluntly spiniform in females but not in males. The sternal shield of females is deeply concave posteriorly (invaginated to level just posterior to the first pair of pores). The dorsal shield of females is widest at the level of setae Z1, its lateral sides are slightly concave, and its posterior end is narrow and sharply wedge shaped. In males the lateral sides of the dorsal shield are nearly parallel, with the posterior end narrowly rounded. The dorsal shield of both sexes bears the usual 26 pairs of small to medium-sized setae, plus setae r2 and r3 in males.

Female: Fig. 6-8.

Measurements. Dorsal shield length 465 μm; greatest width 255 μm. Peritreme length 207 μm. Sternal shield length 11μm; width 104 μm. Genital shield length 108 μm; greatest width 96 μm. Anal shield length 63 μm; greatest width 62 μm. Length of tarsi: I - 75 μm; II - 74 μm; III - 73 μm; and IV - 89 μm. Length of movable chela 46 μm; length of second cheliceral segment 94 μm.

Male: Fig. 9-11.

Legs. Coxal spur formula 0-2-2-1; ventral spurs of coxae II, III, and IV medium sized (length 10-13 μm; basal width 6-8 μm), rather slender and acute; no posteromarginal spur on coxa II. Setae av_1 and pv_1 of tarsus II stout and clawlike; some ventral setae of tarsi II to IV may be somewhat hypertrophied basally; usual leg setae present and normally developed.

Venter. Holoventral shield normal for genus; slightly expanded posterior to genital setae and with only slight constriction anterior to anal field; bears usual 4 pairs of sternal setae, 1 pair of genital setae, 3 pairs of opisthogastric setae (ZvI, Jv1, and Jv2), 1 pair of paranal setae, and single postanal seta; paranal setae at level slightly anterior to middle of anal field. Soft integument of venter bears 17 or 18 pairs of medium-sized (length 20-24 μm) opisthogastric setae. Peritreme of uniform width throughout; extends anteriorly to level of middle of coxa I.

Dorsum. Lateral sides of dorsal shield straight and parallel; posterior end narrowly rounded. Twenty-six pairs of usual dorsal setae present as in females, plus first two setae of r series (r2 and r3); remaining three pairs of setae of r series (r4, r5, and r6), and all setae of R series, set laterally on soft integument; central dorsal setae small in size (length 8-10 μm), but marginal setae, especially anteromarginal and posteromarginal, medium sized (length 17-19 μm).

Measurements. Dorsal shield length 394 μm; greatest width 214 μm. Peritreme length 189 μm. Holoventral shield length 285 μm; anterior width 84 μm; greatest width posterior to genital setae 97 μm; width at level of middle of anal field 55 μm. Length of tarsi: I - 61 μm; II - 56 μm; III - 52 μm; and IV - 72 μm. Length of movable chela 34 μm; length of second cheliceral segment 67 μm.

Deutonymph: Fig. 12-13.

Legs. Coxal spur formula 0-2-1-0; ventral spurs of coxae II and III medium sized (length 7-8 μm; basal width 6-7 μm) and acute to slightly blunt; no posteromarginal spurs on coxae; usual leg setae present and normally developed.

Venter. Sternal shield bears 4 pairs of setae and 3 pairs of circular pores; anterior margin moderately convex; lateral margins moderately concave between setae st. 1 and 2; posterior end narrowly rounded between genital setae. Anal shield small and pyriform in general shape; paranal setae at level of anterior end of anal field. Soft integument of venter bears genital setae plus 17 or 18 pairs of opisthogastric setae; ventral setae medium sized (length 12-17 μm), with sternal setae slightly longer than opisthogastric setae. Peritreme of uniform width throughout; extends anteriorly to level between coxae II and III.

Dorsum. Greatest width of dorsal shield at level of setae s3 or s4; anterolateral margins nearly straight; lateral margins slightly convex and converging posteriorly; posterior end narrowly rounded. Usual 26 pairs of dorsal shield setae present and rather small (length 8-10μm), except setae Z5 (length ca. 31μm), which is three or four times as long as adjacent setae (s5); all 5 pairs of setae of r series present laterally on soft integument, and 14 to 16 pairs of small setae (length 8-9μm) posterolaterally on soft integument.

Measurements. Dorsal shield length 283 μm; greatest width 144 μm. Peritreme length 144 μm. Sternal shield length 145 μm; width 60 μm. Anal shield length 31 μm; greatest width 34 μm. Length of tarsi: I - 53 μm; II - 49 μm; III - 43 μm; and IV - 63 μm. Length of movable chela 36 μm; length of second cheliceral segment 73 μm.

Material examined: One female (SVP-13784 from *Heteromys anomalus*, San Agustín (1108m), 5 km NW Caripe, Monagas, Venezue-

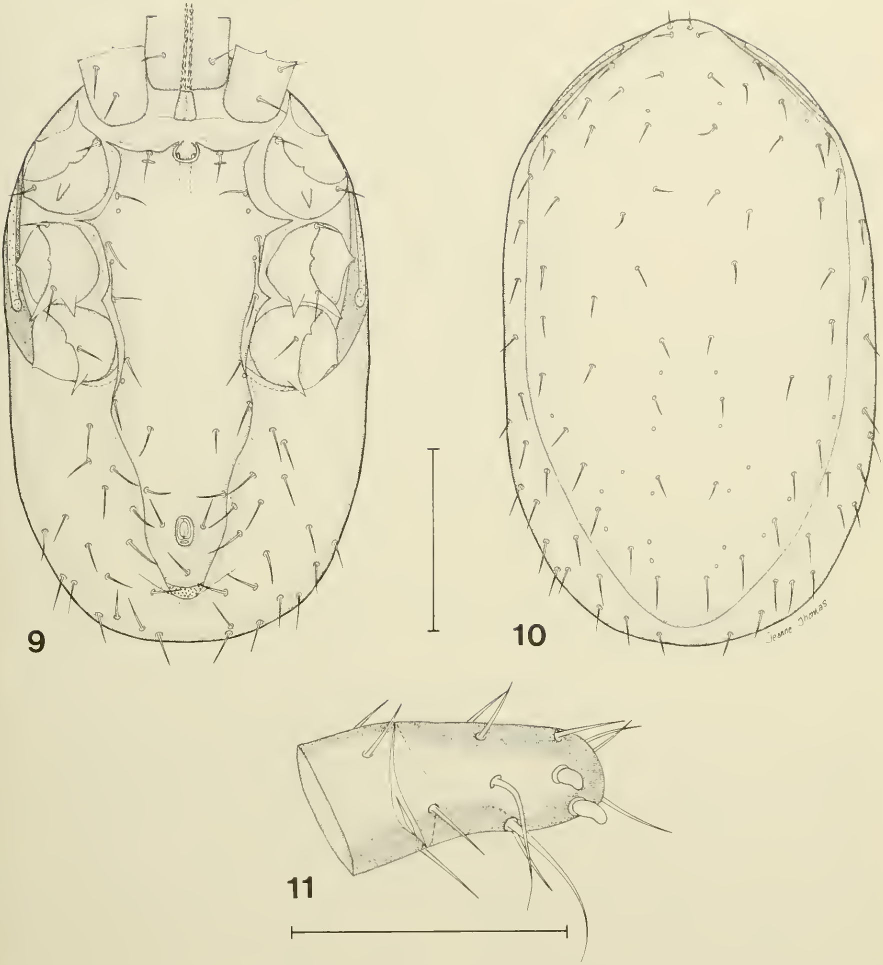

Fig. 9-11. *H. keenani* Strandtmann and Yunker, male. (9) venter; (10) dorsum, scale = 100 μm; (11) ventral view of tarsus II, scale = 50 μm.

la, June 29, 1967, by N. E. Peterson et al.; one female (SVP-33275) from *Sciurus granatensis*, Altamira (794m), Barinas, Venezuela, December 18, 1967, by A. L. Tuttle et al.; one female, one male, and one deutonymph (SVP-34261) from *Sciurus granatensis*, Altamira (600m), Barinas, Venezuela, January 6, 1968, by A. L. Tuttle, et al.; two females (SVP-34265) from *Sciurus granatensis*, Altamira (600m), Barinas, Venezuela, January 7, 1968, by A. L. Tuttle, et al.; one female and one deutonymph (SVP-35444) from *Sciurus granatensis*, La Trinidad (900m), 9km NW Montalbán, Carabobo, Venezuela, August 4, 1968, by A. L. Tuttle, et al.; one female (SVP-40956) from *Sciurus granatensis*, Nultia (24m), 3km N Nula, Apure, Venezuela, February 14, 1968, by A. L. Tuttle, et al.; and four females and two deutonymphs (SVP-41311) from *Sciurus granatensis*, El Rosario (50m), 51km WNW Encontrados, Zulia, Venezuela, March 2, 1968, by A. L. Tuttle, et al.

In addition to the Venezuela material, the

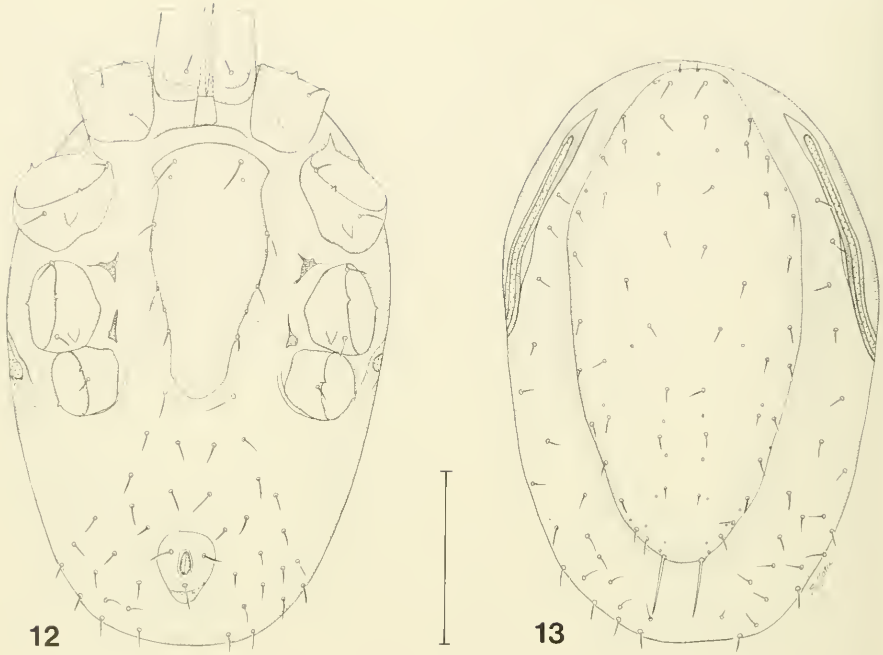

Fig. 12-13. *H. keenani* Strandtmann and Yunker, deutonymph. (12) venter; (13) dorsum, scale = 50 μm.

following specimens from Panamá were used in comparisons: two paratype females (RML 40108) from *Sciurus variegatoides*, Gamboa, Canal Zone, Panamá, December 4, 1960, by N. Gale; one female (RML 44623) from *Sciurus variegatoides*, Ancón, MARU, Canal Zone, Panamá, March 12, 1962, by C. E. Yunker; and one deutonymph (RML 40795) from *Sciurus granatensis*, Martínez Dairy, Cerro Punta, Chiriquí, Panamá, May 2, 1966, by C. E. Yunker.

Remarks: The specimens of *H. keenani* from Venezeula and Panamá are almost identical, differing only slightly in some characters, well within the range of intraspecific variation. In both countries, the preferred hosts of *H. keenani* are squirrels of the genus *Sciurus*. It was collected from *Sciurus granatensis* in both Panamá and Venezuela and from *S. variegatoides* in Panamá.

Hirstionyssus (*H.*) *brachysternum* n. sp. Fig. 14-19.

Diagnosis: The coxal spur formula for both sexes is typically 0-3-2-1, but the only male specimen lacks the posteromarginal spur on the right coxa II; all spurs are medium to large and acute, although ventral spurs of coxae II and III are larger and more acute in females than in the males. The sternal shield of females is deeply concave posteriorly, invagination extending to the level of the first pair of sternal pores. The dorsal shield of females is widest at the level of setae Z1, with the lateral sides straight to slightly concave, and with the posterior end narrow, sharply wedge shaped. The greatest width of the male dorsal shield is at the level of setae s4, its lateral sides are slightly concave, and its posterior end is narrowly rounded. The dorsal shield of females bears the usual 26 pairs of setae, but an additional 5 or 6 pairs are present in the male (r2, r3, and usually r4 plus 3 pairs of setae of R series).

Description, holotype female: Fig. 14-16.

Legs. Coxal spur formula 0-3-2-1; ventral spurs of coxae II and III large (length 23-26 μm; basal width 12-13 μm) and acute; posteromarginal spur of coxa II medium sized (length 12-13 μm; basal width 6-7 μm), narrow, and

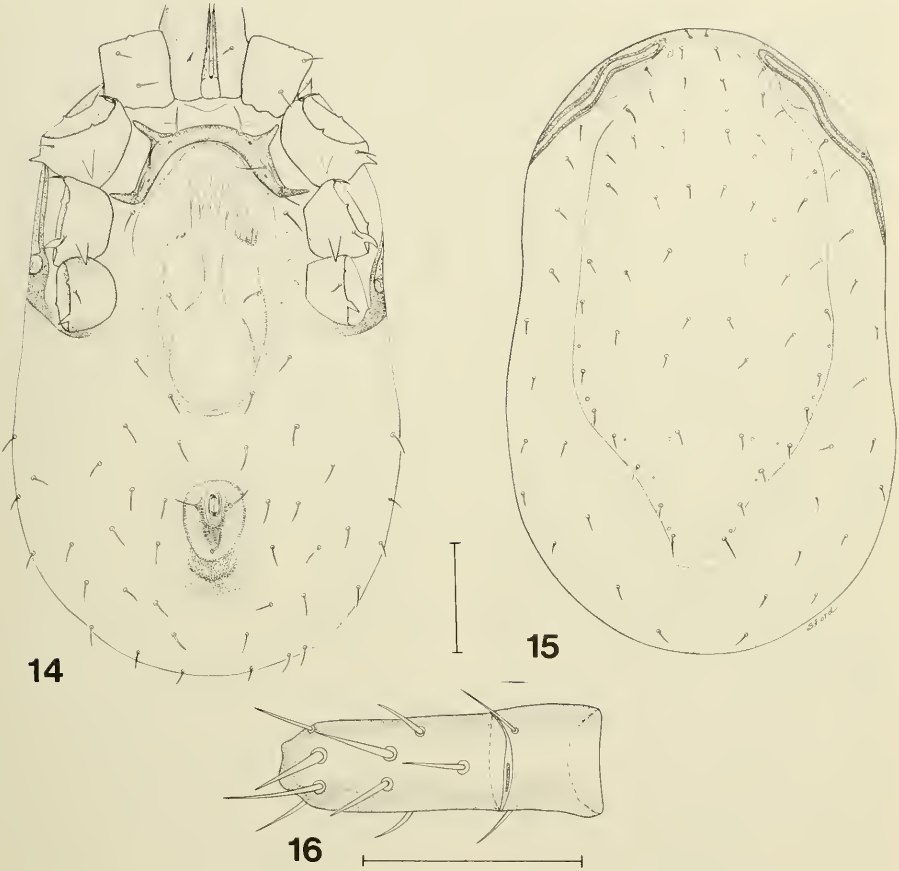

Fig. 14-16. *H. brachysternum* n. sp., female. (14) venter; (15) dorsum, scale = 100 μm; (16) ventral view of tarsus IV, scale 50 μm.

acute; posteromarginal spur of coxa III medium sized (length 12-14 μm; basal width 7-8 μm) and acute; posteroventral spur of coxa IV long (length 10-12 μm; basal width ca. 5 μm), slender, and acute. Setae av$_1$ and pv$_1$ of tarsus II normal, not stout and clawlike; setae av$_1$ of tarsus IV acutely spiniform; some ventral setae of femur IV, genu IV, tibia IV, and tarsus IV enlarged somewhat but not spiniform; usual leg setae present and normal.

Venter. Anterior margin of sternal shield slightly convex; posterior margin extremely concave (invaginated to level of first pair of pores); anterolateral and posterolateral projections long and narrow; setae st. 2 slightly closer to st. 3 than to st. 1. Genital shield slightly expanded posterior to genital setae and rounded posteriorly; line formed by end of genital flap ribs slightly arched; setae Jv1 on soft integument but often touching margin of genital shield. Anal shield pyriform with paranal setae at level of middle of anal field. Soft integument of venter bears 20 to 22 pairs of medium-sized (length 15-17 μm) opisthogastric setae. Peritreme of uniform width except slightly wider posteriorly; extends to level of middle of coxa I or slightly beyond.

Dorsum. Greatest width of dorsal shield at level of setae Z1 or S1; lateral sides straight to slightly concave and gradually converging anteriorly; posterior end narrow, sharply wedge shaped; bears usual 26 pairs of setae with central setae smaller (length 8-9 μm) than marginal (length 12-16 μm). Five pairs of setae of r series laterally on soft integument, and 8 to 10 pairs of opisthosomal setae posterolaterally on soft integument.

Measurements. Dorsal shield length 456 μm; greatest width 218 μm. Peritreme length 211 μm. Sternal shield length 10 μm; width 96 μm. Genital shield length 106 μm; greatest width 96 μm. Anal shield length 60 μm; greatest width 55 μm. Length of tarsi: I - 62 μm; II - 53 μm; III - 58 μm; and IV - 70 μm. Length of movable chela 44 μm; length of second cheliceral segment 101 μm.

ALLOTYPE MALE: Fig. 17-19.

Legs. Coxal spur formula 0-2(3)-2-1; ventral spurs of coxae II and III medium sized (length 10-12 μm; basal width 6-8 μm) and acute to slightly blunt; posteromarginal spur of coxa II small (length 6-7 μm; basal width ca. 6 μm) and blunt (present only on left coxa II of al-

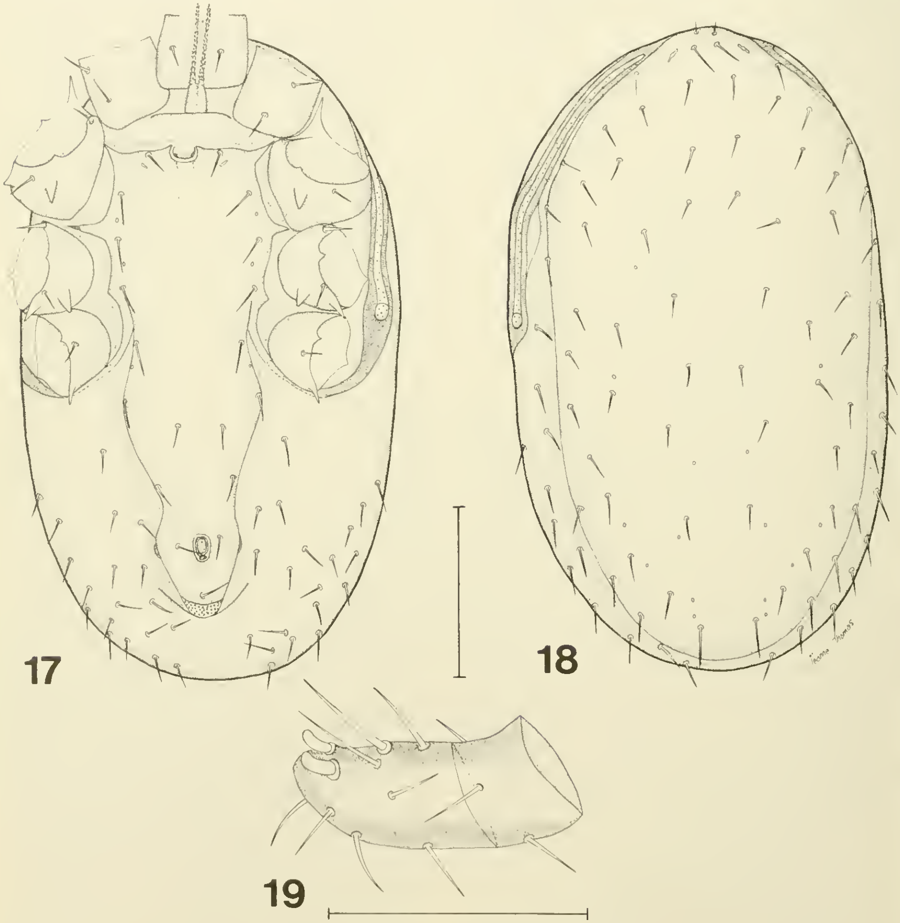

Fig. 17-19. *H. brachysternum* n. sp., male. (17) venter; (18) dorsum, scale = 100 μm; (19) ventral view of tarsus II, scale = 50 μm.

lotype male); posteromarginal spurs of coxae III and IV medium sized (length 10-11 μm; basal width 4-5 μm) but quite slender and acute. Setae av_1 and pv_1 of tarsus II stout and clawlike; usual leg setae present and normally developed.

Venter. Holoventral shield normal for genus; slightly expanded posterior to genital setae, with moderate constriction anterior to anal field; bears usual 4 pairs of sternal setae, 1 pair of genital setae, 3 pairs of opisthogastric setae (Zv1, Jv1, and Jv2), 1 pair of paranal setae, and single postanal seta; paranal setae at level slightly anterior to middle of anal field. Soft integument of venter bears 19 or 20 pairs of medium-sized (length 11-14 μm) opisthogastric setae. Peritreme of uniform width throughout; extends anteriorly to level of middle of coxa I.

Dorsum. Dorsal shield covers almost entire dorsum; greatest width at level of setae s4; lateral sides straight to slightly concave and gradually converging posteriorly; posterior end moderately rounded. Twenty-six pairs of usual dorsal shield setae present, as in female, plus first 2 or 3 pairs of setae of r series (r2, r3 and usually r4) and 3 pairs of setae of R series; soft integument of dorsum bears other 2 pairs of setae of r series (r5 and r6), plus 9 or 10 pairs of setae of R series; dorsal setae small to medium sized, with central dorsal setae smaller (length 7-9 μm) than marginal (length 10-14 μm).

Measurements. Dorsal shield length 358 μm; greatest width 199 μm. Peritreme length 168 μm. Holoventral shield length 252 μm; anterior width 79 μm; greatest width posterior to genital setae 82 μm; width at level of middle of anal field 49 μm. Length of tarsi: I - 51 μm; II - 50 μm; III - 51 μm; and IV - 65 μm. Length of movable chela 43 μm; length of second cheliceral segment 72 μm.

Deutonymph: Unknown.

Type material: Holotype female (SVP-31786) from *Sciurus igniventris*, Raya (135 m), 32 km SSE Puerto Ayacucho, T.F. Amazonas, Venezuela, October 14, 1967, by A. L. Tuttle, et al. Allotype male and one paratype female (SVP-17268) from S. *igniventris, Boca Mavaca* (138 m), 84 km SSE Esmeralda, T.F. Amazonas, Venezuela, March 16, 1967, by M. D. Tuttle, et al. One paratype female, (SVP-15651) from *Carollia perspicillata*, Belén (150 m), Río Cunucunuma, 56 km NNW Esmeralda, T.F. Amazonas, Venezuela, January 11, 1967, by M. D. Tuttle, et al.

Remarks: This species closely resembles *H. keenani*, but differs in the following characters of the female: presence of a distinct posteromarginal spur on coxa II, setae av_1 of tarsus IV not bluntly spiniform (at most somewhat enlarged basally or possibly acutely spiniform), and posterior margin of sternal shield more deeply invaginated. In the male, in addition to having the posteromarginal spur on coxa II, the dorsal shield bears three or four pairs of setae of R series on posterolateral margin, and the posterior end of the dorsal shield is more broadly rounded.

Both *H. brachysternum* and *H. keenani* are recorded from squirrels of the genus *Sciurus*, but the hosts are of different species (*S. granatensis* for *H. keenani* and S. *igniventris* for *H. brachysternum*). Records of *H. keenani* from the pocket mouse, *Heteromys anomalus*, and *H. brachysternum* from the fruit bat, *Carollia perspicillata*, may represent laboratory contaminations or confusion of labels. Except for the posteromarginal spur on coxa II of *H. brachysternum*, both *H. brachysternum* and *H. keenani* are quite similar to several species of Herrin's (1970) "Sciurid host group" of Nearctic *Hirstionyssus* mites.

Hirstionyssus (*H.*) *dorsolatus* n. sp. Fig. 20-22.

Diagnosis: The coxal spur formula of females is 0-2-2-0, the ventral spurs of coxae II and III are medium to large and acute, and the posteromarginal spur of coxa III is small and acute. Setae av_1 and pv_1 of tarsus II are stout and clawlike. The posterior margin of the sternal shield is deeply concave (invaginated to level between setae st. 2 and first pair of pores). The genital shield is rather broadly rounded posteriorly, and its lateral margins are slightly expanded posterior to the genital setae. Setae Jv1 are on the posterolateral margins of the shield. The dorsal shield covers almost the entire dorsum, its greatest width is at the level of setae Z1, its lateral margins are slightly concave and gradually converging anteriorly, and its posterior end is broadly rounded. Dorsal setae r2 and s3 are absent, resulting in 25 pairs of setae on the dorsal shield. Four pairs of setae of the r series are present laterally on the soft integument.

Description, holotype female: Fig. 20-22.

Legs. Coxal spur formula 0-2-2-0; ventral spur of coxa II large (length 27-31 μm; basal width 16-18 μm) and acute; posteromarginal spur of coxa II absent; ventral spur of coxa III medium sized (length 19-21 μm; basal width 8-10 μm) and acute; posteromarginal spur of coxa III small (length 7-9 μm; basal width 6-7 μm) and

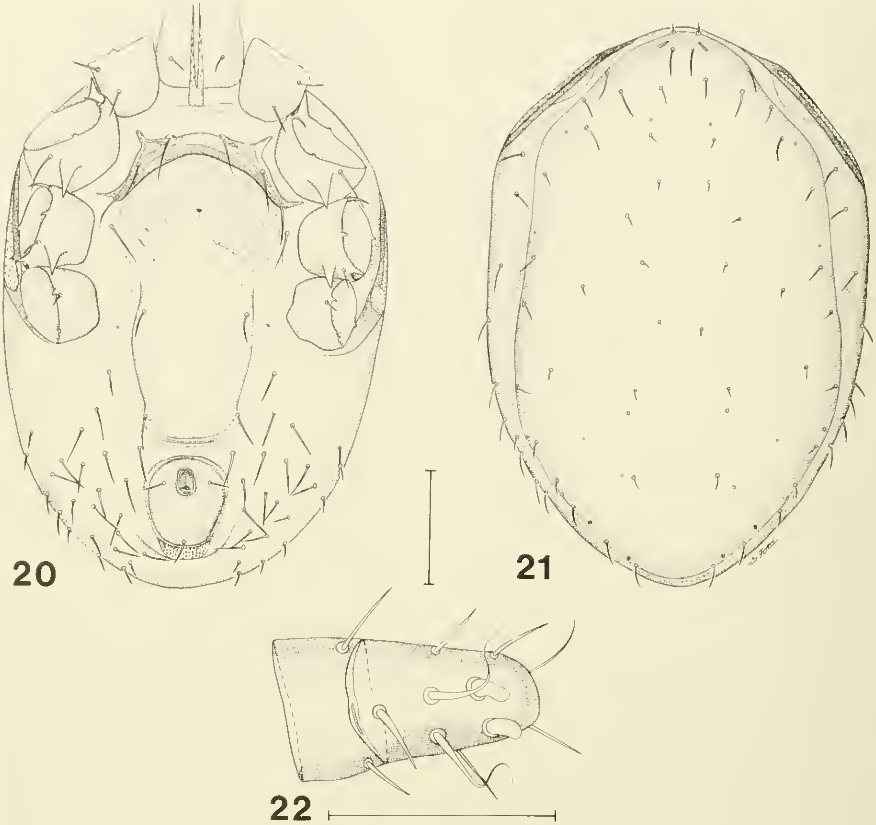

Fig. 20-22. *H. dorsolatus* n. sp., female. (20) venter; (21) dorsum, scale = 100 μm; (22) ventral view of tarsus II, scale = 50 μm.

acute; coxa IV with posteroventral margin serrated or toothed in position of usual spur. Setae av_1 and pv_1 of tarsus II stout and clawlike; some ventral setae of legs, especially tarsi, may be somewhat enlarged basally; usual leg setae present and normal.

Venter. Anterior margin of sternal shield moderately convex; posterior margin deeply concave (invaginated to level between setae st. 2 and first pair of pores); anterolateral and posterolateral projections normal. Lateral sides of genital shield slightly convex and gradually converging toward broadly rounded posterior end; line formed by end of genital flap ribs moderately arched; setae Jv1 apparently on posterolateral margin of shield. Anal shield broadly oval; paranal setae at level of middle of anal field. Soft integument of venter bears 24 to 26 pairs of medium to large (length 24-28 μm) setae. Peritreme of uniform width, except slightly wider posteriorly; extends to near middle of coxa I.

Dorsum. Greatest width of dorsal shield at level of setae Z1; lateral sides straight to slightly concave and coverging gradually anteriorly; posterior end broadly rounded; 25 pairs of setae present on dorsal shield (setae s3 absent); central dorsal setae small (length 7-9 μm) with anterior and lateral dorsal shield setae somewhat larger (length 15-24 μm). First pair of setae of r series (r2) absent; 10 to 12 pairs of medium-sized (length 17-19 μm) setae of R series present on soft integument posterolateral to dorsal shield.

Measurements. Dorsal shield length 444 μm; greatest width 273 μm. Peritreme length 201 μm. Sternal shield length 18 μm; width 96 μm. Genital shield length 101 μm, greatest width 99 μm. Anal shield length 66 μm; greatest width 72 μm. Length of tarsi: I - 65 μm; II - 62 μm; III - 46 μm; and IV - 65 μm. Length of movable chela 41 μm; length of second cheliceral segment 89 μm.

Male: Unknown.

Deutonymph: Unknown.

Type material: Holotype female (SVP-04279) from *Oryzomys minutus*, Laguna Verde (3565 m), 9 km SE Tabay, Mérida, Venezuela, March 20, 1966, by N. E. Peterson, et al.; and one paratype female (SVP-04298) from *Cryptotis thomasi*, Laguna Verde (3545 m), 9 km SE Tabay, Mérida, Venezuela, March 21, 1966, by N. E. Peterson, et al.

Remarks: This species closely resembles *H. rhipidomys*, n. sp. and *H. butantanensis*. It differs from both species in having larger ventral spurs on coxae II and III; a wider sternal shield, with the posterior margin more deeply invaginated; ventral setae JvI on the margin of the genital shield; a broader dorsal shield, particularly at the level of the setae ZI; the posterior end of the dorsal shield more rounded; and the dorsal setae r2 and s3 absent. In addition to these characters, *H. dorsolatus* differs from *H. butantanensis* in the absence of a spur on coxa IV, the broader anal shield, and the larger clawlike setae av_1 and pv_1 on tarsus II. *H. butantanensis, dorsolatum* n. sp. and *rhipidomys* n.sp. are also quite similar to *H. keenani* and *H. brachysternum* but differ in having the stout clawlike setae av_1 and pv_1 on tarsus II and setae av_1 on tarsus IV not spiniform, coxa IV without a ventral spur (except in *H. butantanensis*), and the posterior margin of the sternal shield slightly less concave.

Hirstionyssus (*H.*) *rhipidomys* n. sp. Fig. 23-28.

Diagnosis: The coxal spur formula for females is 0-2-2-0 and for males is 0-2-2-1, the ventral spurs of coxae II and III in both sexes are small to medium sized and acute, and there is no posteromarginal spur on coxa II. Setae av_1 and pv_1 of tarsus II are stout and clawlike in both sexes. In females the posterior margin of the sternal shield is moderately concave (invaginated to level of setae st. 2 or slightly beyond). The genital shield is narrowly rounded posteriorly, its lateral margins are moderately expanded posterior to the genital setae, and setae JvI touch but are not on the shield margins. The dorsal shield of both sexes is widest at the level of setae s4, and the lateral margins are straight or nearly so and converge gradually posteriorly. The posterior end of the dorsal shield is broad and bluntly wedge shaped in females and broadly rounded in males. The dorsal shield of females bears the usual 26 pairs of setae, whereas in males setae S3 is absent and the first 3 setae of the r series (r2, r3, and r4) are on the anterolateral margins of the dorsal shield.

Description, holotype female: Fig. 23-25.

Legs. Coxal spur formula 0-2-2-0; ventral spurs of coxae II and III medium sized (length 11-14 μm; basal width 6-7 μm) and acute; posteromarginal spur on coxa II missing; posteromarginal spur of coxa III medium sized (length 9-10 μm; basal width 4-5 μm) and acute; coxa IV without spur but with marginal serrations in area of usual spur. Setae av_1 and pv_1 of tarsus II stout and clawlike; usual leg setae present and normal.

Venter. Anterior margin of sternal shield slightly convex; posterior margin moderately concave (invaginated to or slightly beyond level of setae st. 2); anterolateral and posterolateral projections normal. Lateral sides of genital shield moderately expanded posterior to genital setae and gradually converging toward posterior end; posterior end narrowly rounded; line formed by end of genital flap ribs moderately arched; setae JvI on soft integument may be touching but not on margin of shield. Anal shield broadly oval; paranal setae at level of middle of anal field. Soft integument of venter bears 17 to 19 pairs of medium to large (length 19-26 μm) setae. Peritreme uniform in width, except slightly wider posteriorly; extends to level of middle of coxa I or slightly beyond.

Dorsum. Greatest width of dorsal shield at level of setae s4; lateral margins straight and nearly parallel although converging slightly toward posterior end; posterior end broad, bluntly wedge shaped; usual 26 pairs of setae present and normally developed; central dorsal setae small to medium sized (length 12-15 μm) and anterior, posterior, and most lateral marginal setae medium to large (length 19-26 μm).

Measurements. Dorsal shield length 456 μm; greatest width 228 μm. Peritreme length 202 μm. Sternal shield length 26 μm; width 99 μm. Genital shield length 108 μm; greatest width 96 μm. Anal shield length 65 μm; greatest width 65 μm. Length of tarsi: I - 67 μm; II - 55 μm; III - 56

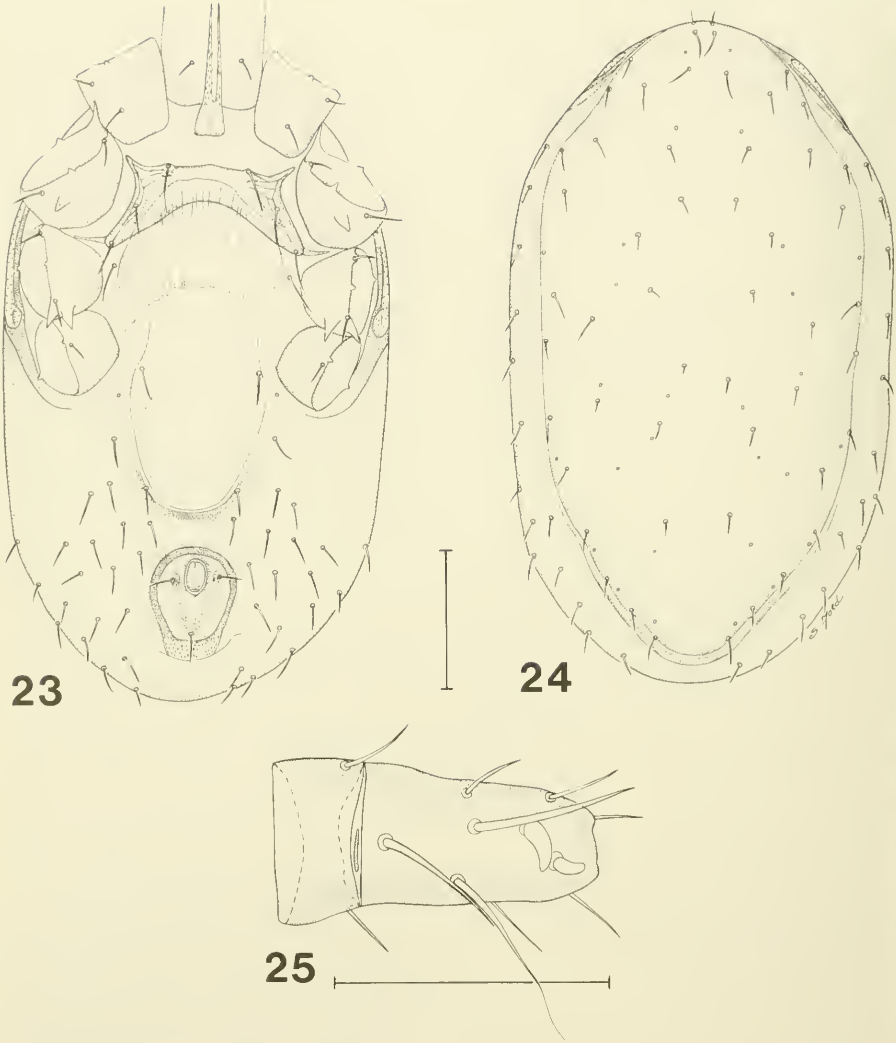

Fig. 23-25. *H. rhipidomys* n. sp., female. (23) venter; (24) dorsum, scale = 100 μm; (25) ventral view of tarsus II, scale = 50 μm.

μm; and IV - 72 μm. Length of movable chela 43 μm; length of second cheliceral segment 94 μm.

ALLOTYPE MALE: Fig. 26-28.

Legs. Coxal spur formula 0-2-2-1; ventral spur of coxa II small (length 7-8 μm; basal width 6-8 μm) and acute; posteromarginal spur of coxa II absent; ventral and posteromarginal spurs of coxa III medium sized (length 10-12 μm; basal width 5-6 μm) and acute; spur of coxa IV small (length 4-5 μm; basal width 3-4 μm) and acute. Setae av_1 and pv_1 of tarsus II stout and clawlike; some ventral leg setae some-

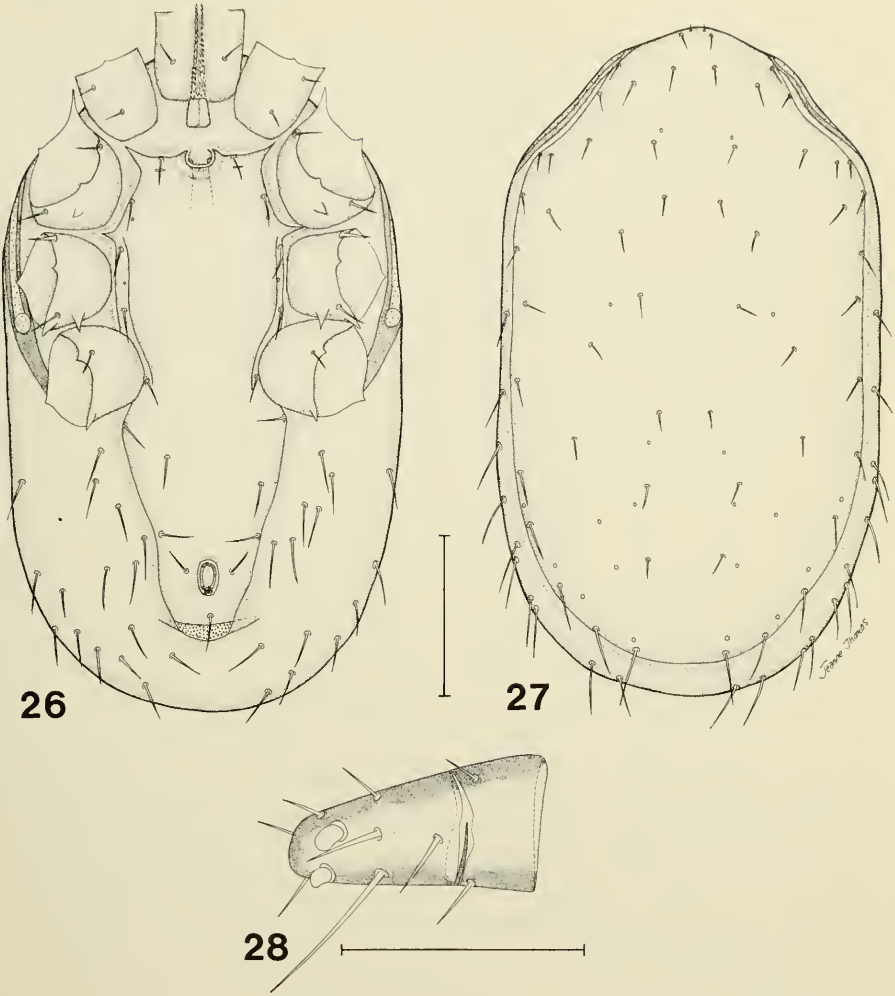

Fig. 26-28. *H. rhipidomys* n. sp., male. (26) venter; (27) dorsum, scale = 100 μm; (28) ventral view of tarsus II, scale = 50 μm.

what enlarged basally; usual leg setae present and normally developed.

Venter. Holoventral shield normal for genus; moderate in width throughout; moderately expanded posterior to coxa IV at level of setae Zv1 and only slightly constricted anterior to anal field; bears usual 4 pairs of sternal setae, 1 pair of genital setae, 3 pairs of opisthogastric setae (Zv1, Jv1, and Jv2), one pair of paranal setae, and single postanal seta; all setae on holoventral shield medium sized to large (length 17-24 μm), with distance between setae greater than setal lengths. Paranal setae at level or slightly anterior to middle of anal field. Soft integument of venter bears 14 to 16 pairs of large (length 26-29 μm) opisthogastric setae; distance between many setae less than setal lengths. Peritreme uniform in width throughout; extends anteriorly to level of middle of coxa I.

Dorsum. Dorsal shield covers almost entire dorsum; greatest width at level of setae s4; lateral sides straight or nearly so and converging gradually posteriorly; posterior end broadly rounded. Shield bears 28 pairs of setae; setae S3 absent; first 3 setae of r series (r2, r3, and r4) on margin of shield; no setae of R series on posterolateral margin; central setae of shield rather small (length 7-9 μm), anterior and lateral marginal setae medium in length (17-19 μm), and posteromarginal setae (especially Z5 and setae of S series) large (length 28-30 μm); setae Z5 about four times longer than setae J3. Eight to 10 pairs of setae of R series posterolaterally on soft integument also rather large (length 26-29 μm).

Measurements. Dorsal shield length 394 μm; greatest width 214 μm. Peritreme length 179 μm. Holoventral shield length 287 μm; anterior width 77 μm; greatest width posterior to genital setae 103 μm; width at level of middle of anal field 53 μm. Length of tarsi: I - 63 μm; II - 48 μm; III - 51 μm; and IV - 70 μm. Length of movable chela 41 μm; length of second cheliceral segment 82 μm.

Deutonymph: Unknown.

Type material: Holotype female, allotype male, and one paratype male (SVP-00857) from *Rhipidomys venustus,* Pico Ávila (2151 m), 5 km NNE Caracas, Miranda, Venezuela, August 27, 1965, by M. D. and A. L. Tuttle; one paratype female (SVP-00818) from the same host and locality, August 26, 1965.

Remarks: Other species closely related to *H. rhipidomys* are discussed in the treatment of *H. dorsolatus. H. rhipidomys* most closely resembles *H. dorsolatus,* differing in the following female characters: ventral spur of coxa II much smaller; posterior margin of sternal shield not so deeply invaginated (reaching only to level of setae st. 2 or slightly beyond); ventral setae Jv1 not on margin of genital shield; and dorsal shield narrower, with posterior end broad, bluntly wedge shaped.

H. rhipidomys was collected only from the climbing mouse (*Rhipidomys venustus*) of the subfamily Cricetinae. One collection of *H. dorsolatus* was also from a cricetine rodent, *Oryzomys minutus.*

Hirstionyssus (*H.*) *butantanensis* (Fonseca, 1932).

Ichoronyssus butantanensis: Fonseca, 1932, Mem. Inst. Butantan (São Paulo) 7:135-138.

Liponyssus latiscutatus: de Meillon and Lavoipierre, 1944, J. Ent. Soc. S. Afr. 7:62; Herrin, 1974, J. Med. Entomol. 11(3):341-346.

Ichoronyssus orcadensis: Turk, 1946, Ann. Mag. Nat. Hist. 11(12):796; Evans and Till, 1966, Bull. Brit. Mus. (Nat. Hist.) Zool. 14(5):278-280, 291.

Hirstionyssus musculi: Bregetova (not Johnston, 1849), 1956, Opred. Faune SSSR 61:185; Evans and Till, 1966, Bull. Brit. Mus. (Nat. Hist.) Zool. 14(5):179-280, 291.

The redescription of the female and the descriptions of the male and deutonymph given by Herrin (1974) are adequate. Only new collection records for this species are presented here.

New records: Three females and one deutonymph (SVP-03724) from *Rattus rattus,* Alto Ño León (1770 m), 31 km WSW Caracas, Dto. Federal, Venezuela, December 21, 1965, by N. E. Peterson, et al.

Hirstionyssus (*H.*) *venezuelensis* n. sp. Fig. 29-35.

Diagnosis: The coxal spur formula for females is 0-1-2-0 and for males 0-1-2-1. In females, the ventral spur and the posteromarginal spur of coxa III are small and blunt, whereas the posteromarginal spur of coxa IV is slender and acute. In males, spurs of all coxae III and IV are slender and acute. Setae av_1 and pv_1 of tarsus II are stout and clawlike in males but not in females. In females the sternal shield is nearly rectangular in shape, the posterior margin is only slightly invaginated, and the posterolateral projections are absent or very narrow and detached from the shield. The genital shield of females is broadly rounded to truncate posteriorly, and the lateral margins are nearly straight and parallel. The holoventral shield of males is rather narrow, especially posterior to coxa IV. The dorsal shield of females is widest at the level of setae s4, the lateral margins are nearly straight and converging posteriorly, and the posterior end is narrowly rounded. The dorsal shield of males covers almost the entire dorsum, and its posterior end is broadly rounded.

Description, holotype female: Fig. 29-30.

Legs. Coxal spur formula 0-1-2-0; ventral spur of coxa II absent (faint broad ridge may be present); posteromarginal spur of coxa II absent (small marginal angulation may be present); ventral spur of coxa III small (length 6-7 μm; basal width 7-9 μm) and blunt to narrowly rounded; posteromarginal spur of coxa

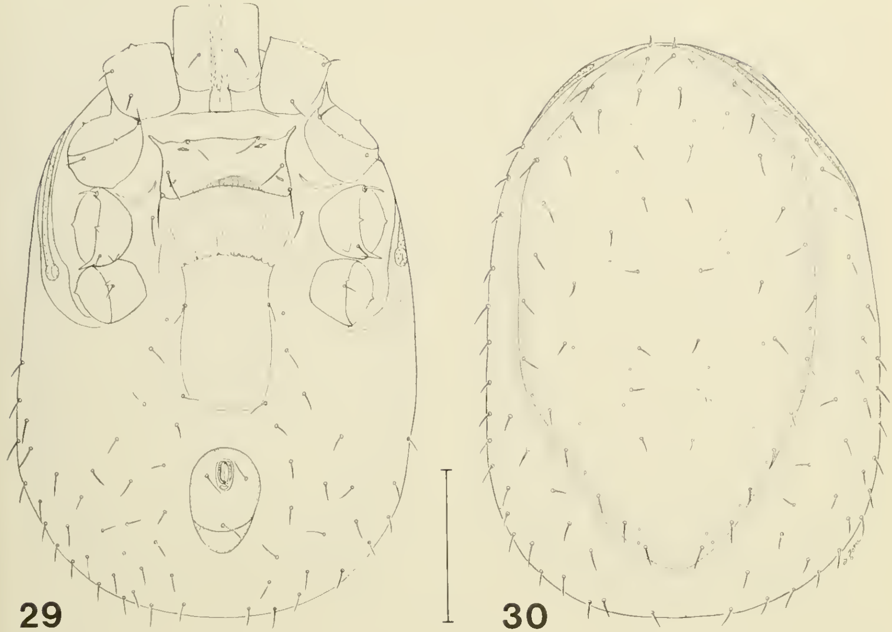

Fig. 29-30. *H. venezuelensis* n. sp., female. (29) venter; (30) dorsum, scale = 100 µm.

III small (length 6-7 µm; basal width 5-6 µm), slender, and acute; spur of coxa IV absent. Setae av$_1$ and pv$_1$ of tarsus II normal, not stout and clawlike; usual leg setae present and normal.

Venter. Sternal shield generally rectangular; medially, anterior margin slightly convex, and posterior margin slightly concave (invaginated to level of second pair of pores or less); anterolateral projections normal, but posterolateral projections absent or very narrow and detached from shield; setae st. 2 distinctly closer to st. 3 than to st. 1. Genital shield slightly expanded posterior to gential setae; posterior end broadly rounded to nearly truncate; line formed by end of genital flap ribs slightly arched; setae Jvl on soft integument and separated from margin of shield by distance greater than setal base diameter. Anal shield elongate pyriform; paranal setae at level of middle of anal field. Soft integument of venter bears 20 to 26 medium-sized (length 14-15 µm) setae. Peritreme of uniform width except slightly wider posteriorly; extends anteriorly to level of middle or anterior half of coxa I.

Dorsum. Greatest width of dorsal shield at level of setae s4; lateral sides straight or nearly so and converging posteriorly; posterior end narrowly rounded; usual 26 pairs of setae present and normally developed; central dorsal setae small (length 10-12 µm) and marginal setae medium sized (length 14-19 µm).

Measurements. Dorsal shield length 460 µm; greatest width 262 µm. Peritreme length 211 µm. Sternal shield length 43 µm; width 109 µm. Genital shield length 94 µm; greatest width 82 µm. Anal shield length 66 µm; greatest width 62 µm. Length of tarsi: I - 90 µm; II - 70 µm; III - 66 µm; and IV - 76 µm. Length of movable chela 41 µm; length of second cheliceral segment 113 µm.

ALLOTYPE MALE: Fig. 31-33.

Legs. Coxal spur formula 0-1-2-1; ventral spur of coxa II absent, but faint broad ridge may be present; ventral spur of coxa III small (length 8-10 µm; basal width 6-7 µm) and acute; posteromarginal spur of coxa III and ventral spur of coxa IV slender (length 10-13 µm; basal width 3-5 µm) and acute. Setae av$_1$ and pv$_1$ of tarsus II stout and clawlike; setae av$_2$ and av$_3$ of

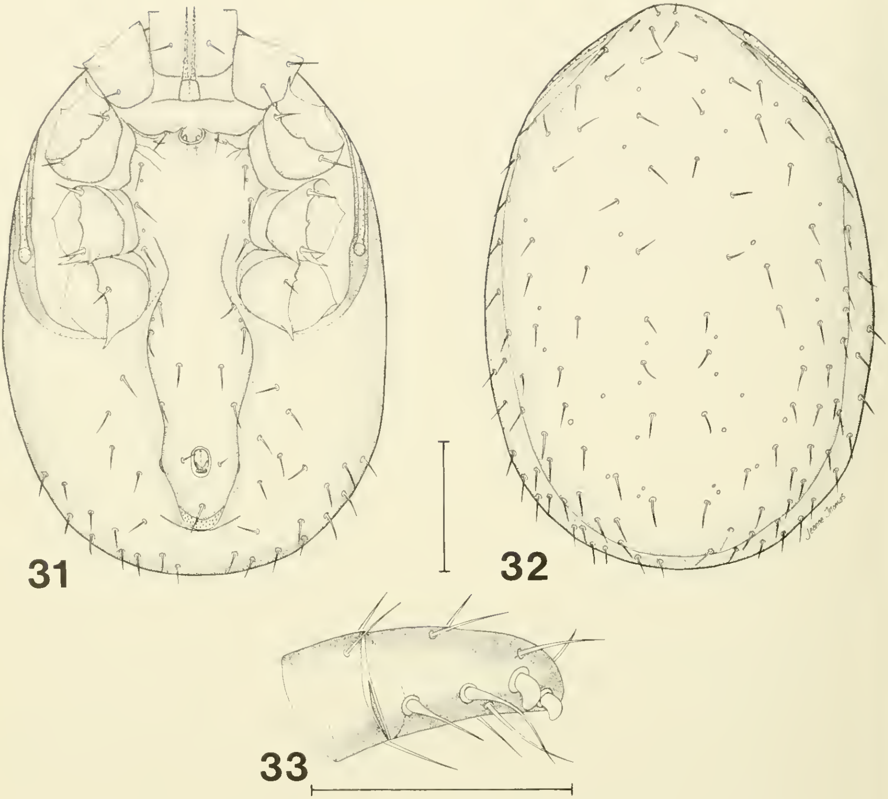

Fig. 31-33. *H. venezuelensis* n. sp., male. (31) venter; (32) dorsum, scale = 100 μm; (33) ventral view of tarsus II, scale = 50 μm.

tarsus II and setae av$_1$, av$_2$, av$_3$, pv$_1$, and pv$_2$ of tarsus IV enlarged basally. All other usual leg setae present and normally developed.

Venter. Holoventral shield normal for genus, although rather narrow posterior to coxa IV; shield only slightly expanded posterior to genital setae and slightly constricted anterior to anal field; bears usual 4 pairs of sternal setae, 1 pair of genital setae, 3 pairs of opisthogastric setae (Zv1, Jv1, and Jv2), 1 pair of paranal setae, and single postanal seta. Paranal setae at level near middle of anal field. Soft integument of venter bears 15 to 17 pairs of medium-sized (length 13-17 μm) opisthogastric setae. Peritreme of uniform width, except slightly wider posteriorly; extends anteriorly to level of middle of coxa I.

Dorsum. Dorsal shield covers almost entire dorsum; greatest width at level of setae s4; lateral sides straight to slightly convex and gradually converging posteriorly; posterior end broadly rounded. Usual 26 pairs of dorsal setae present, as in females, plus first 3 pairs of setae of r series (r2, r3, and r4) and 10 to 16 pairs of setae of R series which, in females, are always on soft integument. Central dorsal setae small (length 12-14 μm); marginal setae medium sized (length 14-21 μm).

Measurements: Dorsal shield length 410 μm; greatest width 266 μm. Peritreme length 188 μm. Holoventral shield length 281 μm; anterior width 84 μm; greatest width posterior to genital setae 82 μm; width at level of middle of anal field 58 μm. Length of tarsi: I - 74 μm; II - 47 μm; III - 46 μm; and IV - 70 μm. Length of movable chela 38 μm; length of second cheliceral segment 80 μm.

Deutonymph: Fig. 34-35.

Legs. Coxal spur formula 0-2-1-0; ventral spurs of coxae II and III small (length 2-3 μm; basal width 7-9 μm) and broadly rounded (may be indistinct broad ridges). Usual leg setae present and normally developed.

Venter. Sternal shield bears 4 pairs of setae and 3 pairs of pores; anterior margin moderately convex; posterior end narrowed posterior to metasternal setae and narrowly rounded between genital setae; with short angular anterolateral projections. Anal shield small and pyriform in general shape; paranal setae at level of anterior end of anal field; soft integument of venter bears genital setae plus 21 to 23 pairs of small to medium-sized (length 10-14 μm) opisthogastric setae. Peritreme of uniform width throughout; extends anteriorly to level of posterior half of coxa I.

Dorsum. Greatest width of dorsal shield at level of setae s4; anterolateral margins slightly concave at level of setae s2; medio- and posterolateral sides slightly convex and converging posteriorly; posterior end narrowly rounded. Usual 26 pairs of setae on dorsal shield, all medium in length (12-14 μm) except setae Z5 which is about two times as long (20-21 μm) as adjacent setae (S5); all 5 pairs of setae of r series present laterally and 15 or 16 pairs of small (length 10-12 μm) setae posterolaterally on soft integument.

Measurements: Dorsal shield length 338 μm; greatest width 200 μm. Peritreme length 172 μm. Sternal shield length 164 μm; width 82 μm. Anal shield length 39 μm; greatest width 39 μm. Length of tarsi: I - 79 μm; II - 57 μm; III - 58 μm; and IV - 70 μm. Length of movable chela 42 μm; length of second cheliceral segment 80 μm.

Type material: All from *Heteromys anomalus* collected by M. D. and A. L. Tuttle. Pico Ávila, 5km NNE Caracas, Miranda, Venezuela: Holotype female, two paratype females, allotype male, two paratype males, and three paratype deutonymphs (SVP-00790), (2151m), August 24, 1965; two paratype females (SVP-00729), (2181m), August 23, 1965; and two paratype fe-

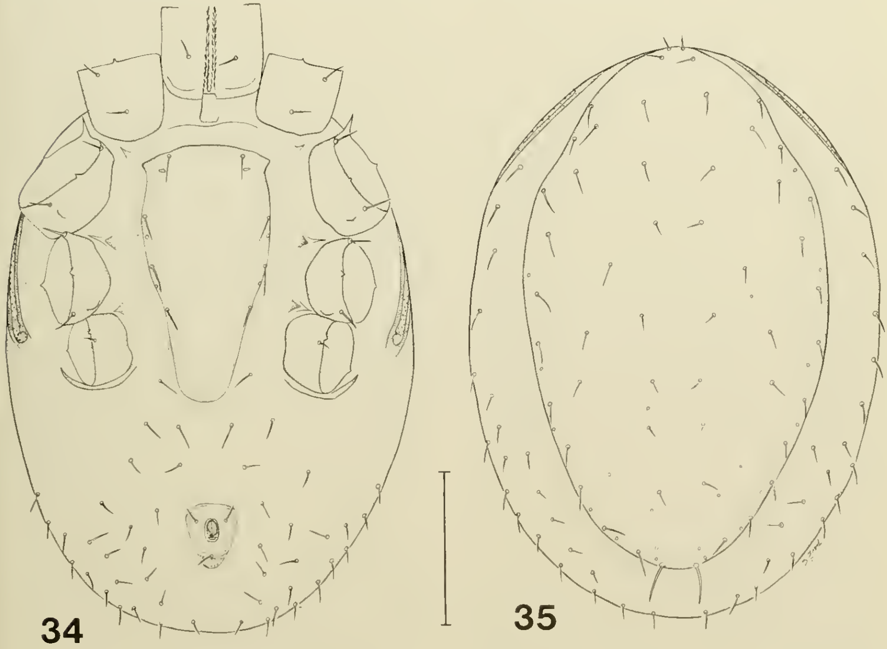

Fig. 34-35. *H. venezuelensis* n. sp., deutonymph. (34) venter; (35) dorsum, scale = 100 μm.

males (SVP-00730), (2095), August 23, 1965. Pico Ávila (2181m), Dto. Federal, Venezuela: one paratype female (SVP-00795), August 25, 1965.

Additional material examined: All collected by N. E. Peterson, et al. from *Heteromys anomalus* in Venezuela. Two females (SVP-02429) near Agua Santa (90m), 32km NW Valera, Trujillo, August 25, 1965; eight females (SVP-02444), near Isnoto (930m), 12km WNW Valera, Trujillo, August 27, 1965; one female (SVP-03289) near El Dividive (90m), 30km NW Valera, Trujillo, October 15, 1965; two females (SVP-04599), San Andrés (1144m), 16km SSE Caracas, Miranda, August 10, 1966; one female (SVP-13026), Quebrada Chacaito (1170m), 3km NE Caracas, Miranda, May 16, 1968; two females (SVP-13651), San Agustín (1170m), 5km NW Caripe, Monagas, June 23, 1967; five females (SVP-14294), San Agustín (1335m), 5km NW Caripe, Monagas, July 15, 1967; four females (SVP-14641), Manacal (278m), 26km ESE Carúpano, Sucre, August 1, 1967; six females (SVP-14527) Manacal (575m), 26km ESE Carúpano, Sucre, July 27, 1967; one deutonymph (SVP-14531), Manacal (190m), 26km ESE Carúpano, Sucre, July 27, 1967; one female (SVP-22959) and one female (SVP-22963), Hda. Socopito (470m), 80km NW Carora, Falcón, May 21 and 22, 1968, respectively; eighteen females and two males (SVP-23093), Río Socopito (470m), 80km NW Carora, Falcón, May 26, 1968; four females and one deutonymph (SVP-23034), Río Socopito (470m), 80 km NW Carora, Falcón, May 26, 1968; four females (SVP-23121), Río Socopito (470m), 80 km NW Carora, Falcón, May 27, 1968.

Remarks: This species closely resembles *H. brevicalcar* n. sp. from Nicaragua, but differs in the following female characters: ventral spur of coxa II absent or at most represented by a broad indistinct ridge; sternal shield less than three times as wide as long; posterior end of genital shield more truncate in shape; posterior end of dorsal shield broad, bluntly wedge shaped rather than rounded. In males there is no ventral spur on coxa II and the holoventral shield is distinctly narrower throughout. In deutonymphs the ventral spurs are much less distinct, represented only by rather broad, rounded apophyses, and the sternal shield is narrower.

H. venezuelensis n. sp. was found only on *Heteromys anomalus*. In all, 56 females, 5 males, and 6 deutonymphs were collected from 15 host animals. In 7 of the 15 collections, specimens of *H. parvisoma* n. sp. were also recovered from the same individual host. These two species differ in several distinctive characters of the female. *H. venezuelensis* n. sp. is definitely larger than *H. parvisoma* n. sp.; it lacks ventral spurs on coxae II and IV; the sternal shield is narrower and more rectangular in shape, its posterior margin is only slightly concave, and the posterolateral projections are absent or, at most, they are small and detached from the shield; and the posterior end of the dorsal shield is not as definitely rounded as in *H. parvisoma* n. sp.

Hirstionyssus (H.) *brevicalcar* n. sp. Fig. 36-42.

Diagnosis: The coxal spur formula for females is 0-2-2-0 and for males is 0-2-2-1; the ventral spurs of coxae II and III are small and narrowly rounded in both sexes; the posteromarginal spur on coxa II is represented only by a small posterior angulation; the posteromarginal spur of coxa III is small, broad, and acute in females, and long, slender, and acute in males. Setae av_1 and pv_1 of tarsus II are stout and clawlike in males but not in females. In females the sternal shield is widely rectangular, the posterior margin is only slightly concave, and the posterolateral projections are absent or very narrow and detached from the shield. The dorsal shield of females is widest at the level of setae Z1, the lateral margins are nearly straight or slightly concave and converging anteriorly, and the posterior end is narrowly rounded. The dorsal shield of males is widest at the level of setae s4, the lateral margins are straight to slightly concave and converging posteriorly, and the posterior end is broadly rounded. The dorsal shield of both sexes bears the usual 26 pairs of setae, plus, in males, the first 3 pairs of setae of the r series and 5 or 6 pairs of setae of the R series.

Description, holotype female: Fig. 36-37.

Legs. Coxal spur formula 0-2-2-0; ventral spur of coxa II small (length 7-8 μm; basal width 6-7 μm) and narrowly rounded; posteromarginal spur of coxa II absent (small angulation may be present); ventral spur of coxa III small (length 9-10 μm; basal width 8-10 μm) and blunt; posteromarginal spur of coxa III very small (length 4-5 μm; basal width 2-4 μm), lightly sclerotized, and acute; spur of coxa IV absent, but posteroventral margin may have small rounded apophysis. Setae av_1 and pv_1 of tarsus II normal, not stout and clawlike; usual leg setae present and normal.

Venter. Sternal shield widely rectangular; anterior margin straight; posterior margin

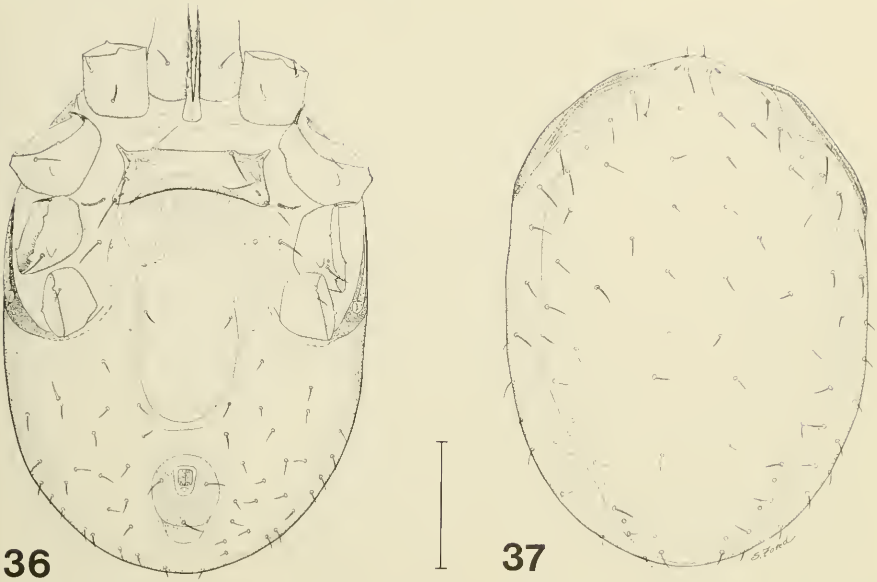

Fig. 36-37. *H. brevicalcar* n. sp., female. (36) venter; (37) dorsum, scale = 100 μm.

slightly and broadly concave (invaginated to level of second pair of pores or less); anterolateral projections normal, but posterolateral projections absent or very narrow and detached from margins of shield; setae st. 2 distinctly closer to st. 3 than to st. I. Genital shield slightly expanded laterally posterior to genital setae and broadly rounded posteriorly; line formed by end of genital flap ribs slightly arched; setae Jvl on soft integument, separated from margin of shield by distance greater than setal base diameter. Anal shield elongate pyriform; paranal setae at level of middle of anal field. Soft integument of venter bears 24 to 26 medium-sized (length 12-16 μm) setae. Peritreme of uniform width, except slightly wider posteriorly; extends anteriorly to level of middle of coxa I.

Dorsum. Greatest width of dorsal shield at level of setae s6 or ZI; lateral sides irregularly straight and converging anteriorly; posterior end moderately rounded; usual 26 pairs of dorsal setae present and normally developed; central dorsal setae medium sized (length 12-14 μm), and marginal setae larger (length 16-24 μm).

Measurements. Dorsal shield length 378 μm; greatest width 230 μm. Peritreme length 176 μm. Sternal shield length 29 μm; width 107 μm. Genital shield length 79 μm; greatest width 79 μm. Anal shield length 54 μm; greatest width 47 μm. Length of tarsi: I - 70 μm; II - 66 μm; III - 55 μm; and IV - 78 μm. Length of movable chela 42 μm; length of second cheliceral segment 123 μm.

ALLOTYPE MALE: Fig. 38-40.

Legs. Coxal spur formula 0-2-2-1; ventral spurs of coxae II and III small (length 5-6 μm; basal width 5-7 μm) and narrowly rounded; posteromarginal spur of coxa III and ventral spur of coxa IV long (length 7-10 μm; basal width 3-5 μm), slender, and acute. Setae av_1 and pv_1 of tarsus II stout and clawlike; ventral setae of tarsi III and IV may be somewhat enlarged basally; usual leg setae present and normally developed.

Venter. Holoventral shield normal for the genus, rather wide throughout; slightly expanded posterior to genital setae and narrows sharply toward anal area; bears usual 4 pairs of sternal setae, I pair of genital setae, 3 pairs of opisthogastric setae (Zvl, Jvl, and Jv2), I pair of paranal setae, and single postanal seta. Paranal setae at level slightly anterior to middle of anal field. Soft integument of venter bears 13 to 16 pair of medium-sized (length 11-13 μm) opis-

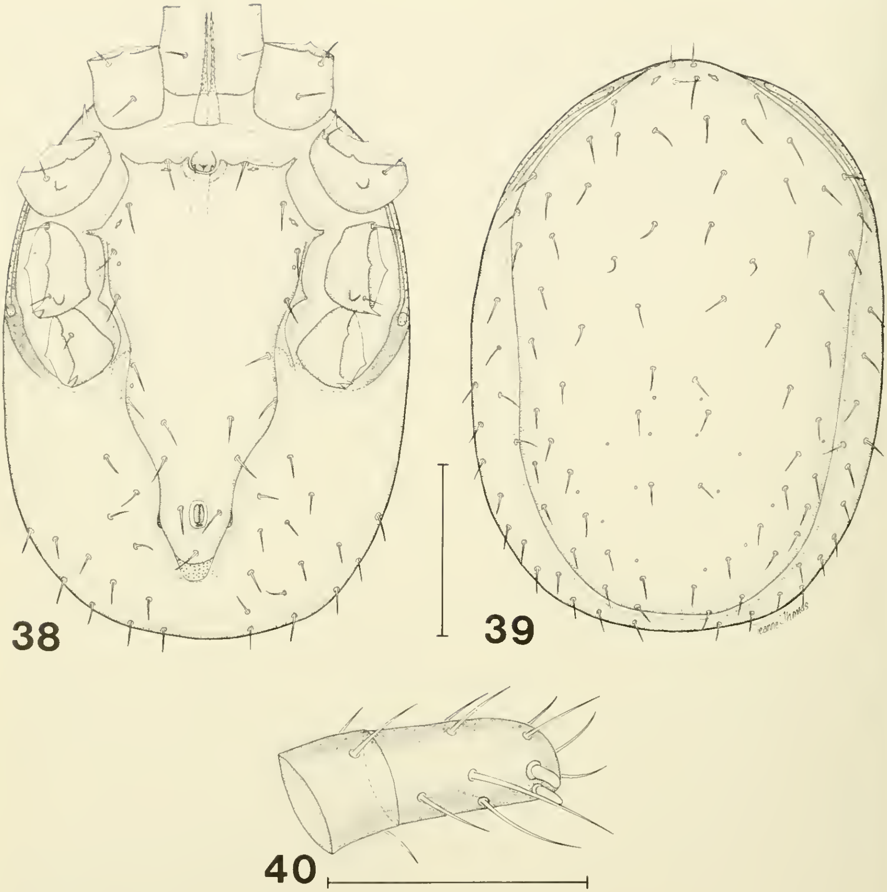

Fig. 38-40. *H. brevicalcar* n. sp., male. (38) venter; (39) dorsum, scale = 100 μm; (40) ventral view of tarsus II, scale = 50 μm.

thogastric setae. Peritreme of uniform width throughout; extends anteriorly to level of middle of coxa I.

Dorsum. Dorsal shield covers almost entire dorsum; greatest width at level of setae s4; laterally straight to slightly concave and converging posteriorly; broadly rounded posteriorly; usual 26 pairs of dorsal setae present, as in females, plus first 3 pairs of setae of r series (r2, r3, and r4) and 6 or 7 pairs of setae of R series, which in females are always on soft integument. All dorsal setae medium in length (12-19 μm) and normally developed.

Measurements. Dorsal shield length 332 μm; greatest width 207 μm. Peritreme length 160 μm. Holoventral shield length 236 μm; anterior width 94 μm; greatest width posterior to genital setae 94 μm; width at level of middle of anal field 47 μm. Length of tarsi: I - 64 μm; II - 51 μm; III - 49 μm; and IV - 64 μm. Length of movable chela 35 μm; length of second cheliceral segment 70 μm.

DEUTONYMPH: Fig. 41-42.

Legs. Coxal spur formula 0-2-1-0; ventral spur of coxa II small (length 2-3 μm; basal

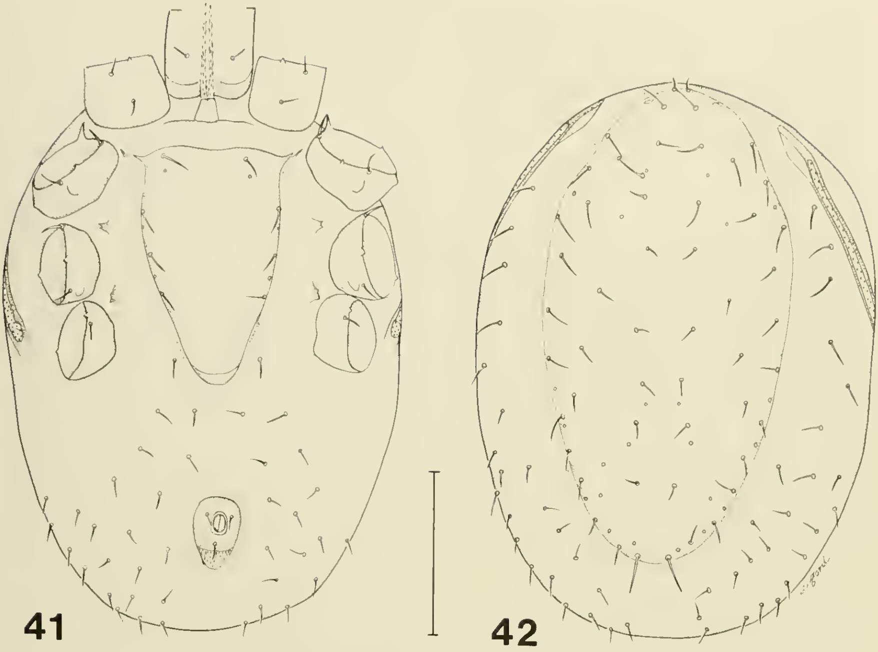

Fig. 41-42. *H. brevicalcar* n. sp., deutonymph. (41) venter; (42) dorsum, scale = 100 μm.

width 7-9 μm) and broadly rounded (may be represented only by indistinct broad ridge); posterior margin of coxa II may have small indistinct angulation; ventral spur of coxa III small (length 3-5 μm; basal width 5-7 μm) and narrowly rounded; usual leg setae present and normally developed.

Venter. Sternal shield bears 4 pairs of sternal setae and 3 pairs of pores; anterior margin slightly concave medially; posterior end narrowed posterior to metasternal setae and narrowly rounded just posterior to genital setae; with short angular anterolateral projections. Anal shield small and pyriform; paranal setae at level of anterior end of anal field. Soft integument of venter bears genital setae, plus 18 to 22 pairs of small (length 8-12 μm) opisthogastric setae. Peritreme of uniform width throughout; extends anteriorly to level of anterior edge of coxa II.

Dorsum. Greatest width of dorsal shield at level of setae s4; anterolateral margin slightly concave at level of setae s2; medio- and posterolateral sides slightly convex and converging posteriorly; posterior end narrowly rounded. Usual 26 pairs of setae on dorsal shield; all medium in length (10-17 μm) except setae Z5 which are about two times as long (18-19 μm) as adjacent setae (s5); all 5 pairs of setae of r series present laterally and 17 to 19 pairs of setae of R series present posterolaterally on soft integument.

Measurements. Dorsal shield length 288 μm; greatest width 159 μm. Peritreme length 133 μm. Sternal shield length 148 μm; width 82 μm. Anal shield length 31 μm; greatest width 31 μm. Length of tarsi: I - 62 μm; II - 51 μm; III - 47 μm; and IV - 58 μm. Length of movable chela 37 μm; length of second cheliceral segment 85 μm.

TYPE MATERIAL: Holotype female, two paratype females, allotype male, and 1 paratype deutonymph (RML 47268) from *Liomys salvini vulcani*, Chinandega, Nicaragua, July 16, 1966, by J. K. Jones, Jr.

REMARKS: This species closely resembles *H. venezuelensis* but differs in the following female characters: ventral spur of coxa II present; sternal shield more than three times as wide as long; posterior end of genital shield broadly rounded rather than truncate; and posterior end of dorsal shield narrowly rounded rather than broad, bluntly wedge shaped. In males coxa II bears a ventral spur and the holoventral shield is distinctly wider throughout. In the deutonymph the ventral spurs are more distinct and the sternal shield is wider.

Hirstionyssus (*H.*) *galindoi* Strandtmann and Yunker, 1966. Fig. 43-46.

Although a detailed description of the female of this species was given by Strandtmann and Yunker (1966), their description of the deutonymph was inadequate, and there were no illustrations. These deficiencies are rectified here.

Diagnosis: The coxal spur formula for females is 0-2-2-1, the ventral spur of coxa II is represented only by a broad indistinct apophysis or boss, and spurs of coxae III and IV are small and acute. Setae av_1 and pv_1 of tarsus II are normal, not stout and clawlike. The posterior margin of the sternal shield is broadly and moderately concave (invaginated to level of setae st. 2). The gential shield is moderately rounded posteriorly and its lateral margins are only slightly expanded posterior to the genital setae; setae Jv1 are on the posterolateral margins of the shield. The dorsal shield is widest at the level of setae Z1, its lateral margins are slightly convex and gradually converging anteriorly, its posterior end is broad, bluntly wedge shaped, and it bears the usual 26 pairs of small to medium-sized setae.

Female: Fig. 43-44.

The following measurements and accompanying illustrations of a Venezuela female specimen (SVP-00571) are given to facilitate comparison with typical Panamá material.

Measurements: Dorsal shield length 460 μm; greatest width 275 μm. Peritreme length 204 μm. Sternal shield length 27 μm; width 106 μm; Genital shield length 109 μm; greatest width 94 μm. Anal shield length 62 μm; greatest width 58 μm. Length of tarsi: I - 74 μm; II - 70 μm; III - 52 μm; and IV - 71 μm. Length of mov-

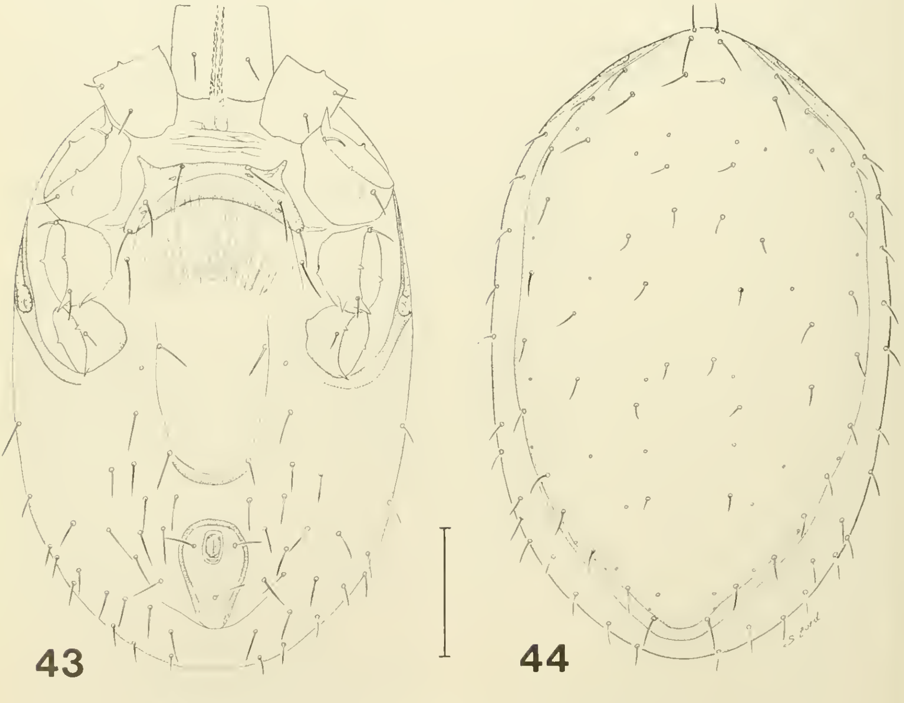

Fig. 43-44. *H. galindoi* Strandtmann and Yunker, female. (43) venter; (44) dorsum, scale = 100 μm.

able chela 52 μm; length of second cheliceral segment 108 μm.

MALE: Unknown.

DEUTONYMPH: Fig. 45-46.

Legs. Coxal spur formula 0-2-1-0; ventral spur of coxa II small (length 4-6 μm; basal width 5-7 μm) and acute to blunt; ventral spur of coxa III medium sized (length 7-9 μm; basal width 6-8 μm) and acute; posteroventral margin of coxa IV serrate; usual leg setae present and normally developed.

Venter. Sternal shield bears 4 pairs of setae and 3 pairs of pores; anterior margin slightly convex; posterior end narrowly rounded between genital setae; anterolateral projections lightly sclerotized and not definitely distinguishable. Anal shield small and pyriform; paranal setae at level slightly anterior to middle of anal field; paranal setae subequal in length to postanal seta. Soft integument of venter bears genital setae plus about 22 pairs of small to medium-sized (length 7-17 μm) opisthogastric setae. Peritreme of uniform width throughout; extends anteriorly to level of anterior coxa II.

Dorsum. Greatest width of dorsal shield at level of setae s4; anterolateral margins slightly concave between setae s1 and z4; lateral sides gently convex and gradually converging posteriorly; posterior end narrowly rounded; usual 26 pairs of setae present and normally developed; dorsal setae small to medium in length (7-13 μm) except setae Z5 which are three or four times as long (30-33 μm) as adjacent setae (s5); all 5 pairs of setae of r series and 13 to 16 pairs of setae of R series on soft integument and all rather small (length 7-9 μm).

Measurements. Dorsal shield length 291 μm; greatest width 166 μm. Peritreme length 133 μm. Sternal shield length 141 μm; width 65 μm. Anal shield length 34 μm; greatest length 37 μm. Length of tarsi: I - 55 μm; II - 48 μm; III - 46 μm; and IV - 63 μm. Length of movable chela 39 μm; length of second cheliceral segment 79 μm.

MATERIALS EXAMINED: One female (SVP-00571) from *Oryzomys concolor*, Los Verados (1500m), 4km NNW Caracas, Dto. Federal, Venezuela, August 5, 1965, and three females (SVP-00640) from *Anoura* sp. A, Los Venados

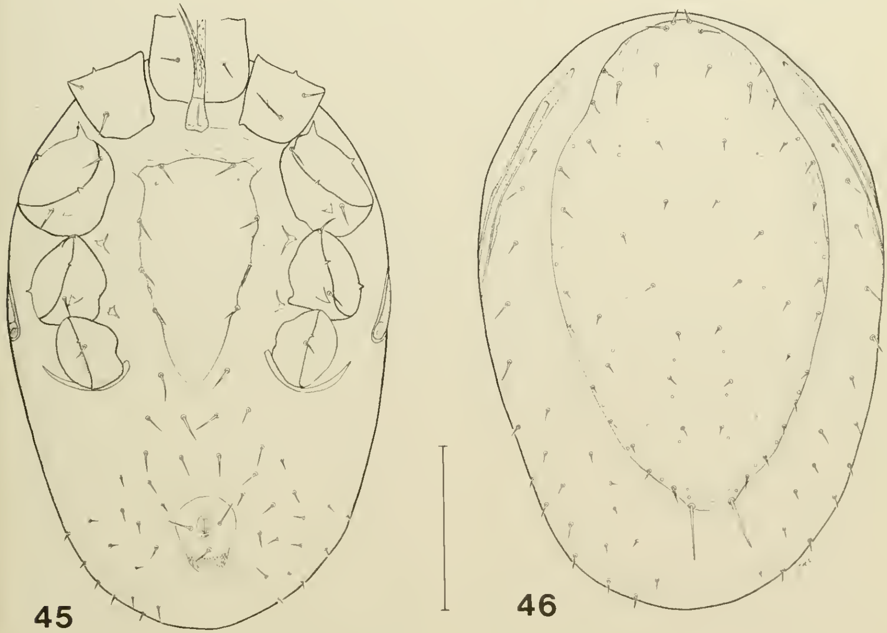

Fig. 45-46. *H. galindoi* Strandtmann and Yunker, deutonymph. (45) venter; (46) dorsum, scale = 100 μm.

μm; and IV - 70 μm. Length of movable chela (1465m), 4km NNW Caracas, Dto. Federal, Venezuela, August 15, 1965, by N. E. Peterson, M. D. Tuttle, et al. In addition to this Venezuela material, two paratype females (RML 44973) from *Peromyscus nudipes,* Cerro Punta, Chiriquí, Panamá, collected March 14, 1962, by C. E. Yunker, and two paratype deutonymphs (RML 44913) from the same host and locality, collected March 9, 1962, were examined for comparison.

REMARKS: *H. galindoi* has been collected in Panamá and Venezuela primarily from rodents of the family Cricetidae (genera *Oryzomys, Peromyscus,* and *Scotinomys*). Only one collection, perhaps an accidental contamination, has been recorded from a non rodent host: *Anoura* sp. A in Venezuela.

The only deviation of significance noted in the comparison of the Venezuela females with the Panamá paratypes and the original description was in the length of the sternal and anal setae. In the Venezuela specimens these setae appear to be slightly longer: the st. 1 setae reach to or slightly beyond the posterior margin of the shield, and the anal setae are as long as or slightly longer than the anal field. These, as well as other minor differences, are considered to be within the range of intraspecific variation. *H. galindoi* resembles *H. parvisoma* n. sp. but differs in the following characters: overall size distinctly greater, ventral spur of coxa II absent or at most represented by an indistinct apophysis, setae Jv1 on posterolateral margins of genital shield, and posterior end of dorsal shield broad, bluntly wedge shaped rather than moderately rounded.

Hirstionyssus (*H.*) *parvisoma* n. sp. Fig. 47-53.

DIAGNOSIS: The coxal spur formula for females is 0-2-2-1 and for males 0-1-2-1; the ventral spur of coxa II is small and blunt to narrowly rounded in females and absent in males; there is no posteromarginal spur on coxa II (there may be a small angulation); and the spurs of coxae III and IV of both sexes are small to medium sized and acute. Setae av_1 and pv_1 of tarsus II are stout and clawlike in males but normal in females. The posterior margin of the female sternal shield is moderately concave (invaginated to level between second pores and setae st. 2). The genital shield is narrowly rounded posteriorly, the lateral sides are only slightly expanded posterior to the genital setae, and setae Jvl are not on the shield. The holoventral shield of males is rather broad between the coxae but somewhat narrowed posterior to coxa IV. The dorsal shield of both sexes is widest at the level of setae s4, the lateral margins are straight or slightly concave and converging gradually posteriorly, and the posterior end is narrowly rounded in females but broadly rounded in males. The dorsal shield of both sexes bears the usual 26 pairs of setae, but in males the first 3 setae of the r series and 4 to 5 setae of the R series are also present on the margins.

DESCRIPTION, HOLOTYPE FEMALE: Fig. 47-48.

Legs. Coxal spur formula 0-2-2-1; ventral spur of coxa II small (length 4-6 μm; basal width 9-11 μm) and blunt to narrowly rounded; posteromarginal spur of coxa II absent (sometimes represented by a small angulation); ventral spur of coxa III medium sized (length 7-9 μm; basal width 7-8 μm) and acute to blunt; posteromarginal spur of coxa III and ventral spur of coxa IV small (length 4-5 μm; basal width 4-5 μm) and acute. Setae av_1 and pv_1 of tarsus II normal, not stout and clawlike; usual leg setae present and normal.

Venter. Anterior margin of sternal shield straight or nearly so; posterior margin moderately concave (invaginated to level between second pair of pores and setae st. 2); anterolateral projection rather short and broad, but posteromarginal projection long and narrow; setae st. 2 and 3 close-set. Genital shield slightly expanded posterior to genital setae, with lateral sides convex and posterior end narrowly to bluntly rounded; line formed by end of genital flap ribs slightly arched; setae Jvl on soft integument and separated from margin of shield by distance greater than setal base diameter. Anal shield small and broadly oval; paranal setae at level of middle of anal field. Soft integument of venter bears 19 to 21 medium-sized (length 14-17 μm) setae. Peritreme of uniform width throughout; extends to level of anterior half of coxa I.

Dorsum. Greatest width of dorsal shield at level of setae s4; lateral sides nearly straight and converging posteriorly; posterior end narrowly rounded; usual 26 pairs of dorsal setae present and normally developed; central dorsal setae small (length 10-14 μm); anterior and lateral marginal setae slightly longer (17-20 μm).

Measurements. Dorsal shield length 351 μm; greatest width 191 μm. Peritreme length 158 μm. Sternal shield length 22 μm; width 84 μm. Genital shield length 78 μm; greatest width 72 μm. Anal shield length 46 μm; greatest width 46 μm. Length of tarsi: I - 67 μm; II - 61 μm; III - 60

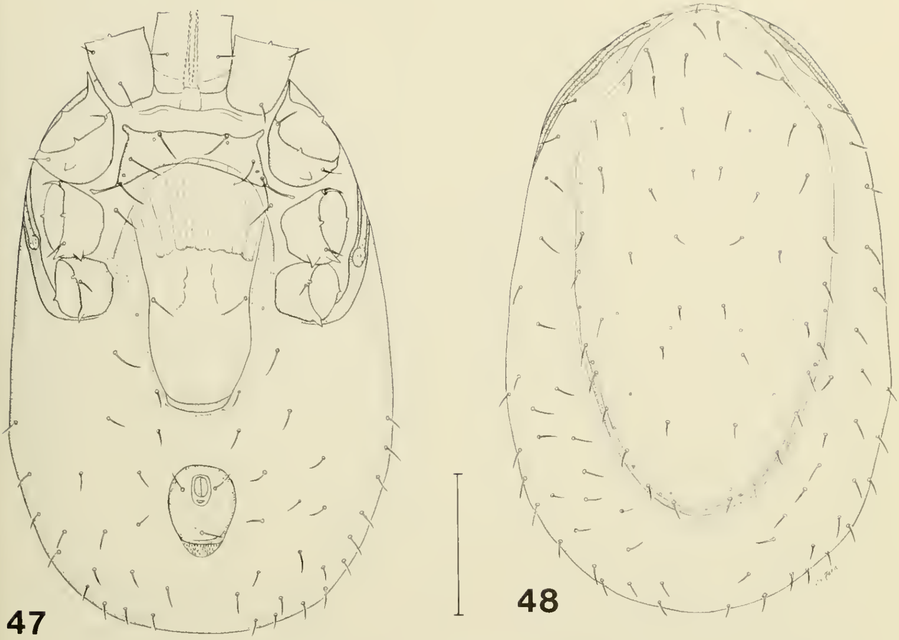

Fig. 47-48. *H. parvisoma* n. sp., female. (47) venter; (48) dorsum, scale = 100 μm.

38 μm; length of second cheliceral segment 87 μm.

Allotype male: Fig. 49-51.

Legs. Coxal spur formula 0-1-2-1; ventral and posteromarginal spurs of coxa II absent; ventral spur of coxa III medium sized (length 7-8 μm; basal width 4-5 μm) and acute; posteromarginal spur of coxa III and ventral spur of coxa IV small (length 8-10 μm; basal width 4-5 μm), slender, and acute. Setae av_1 and pv_1 of tarsus II stout and clawlike; some ventral setae of tarsi II, III, and IV enlarged basally; other usual leg setae present and normally developed.

Venter. Holoventral shield normal for the genus; rather broad between coxae, narrowed between coxae IV, and moderately expanded immediately posterior to coxa IV. Shield bears usual 4 pairs of sternal setae, 1 pair of genital setae, 3 pairs of opisthogastric setae (Zv1, Jv1, and Jv2), 1 pair of paranal setae, and single postanal seta; all ventral setae short to medium in length (12-19 μm), usually less than distance between adjacent ventral setae; setae Zv1 close to genital setae (distance between less than length of genital setae). Paranal setae at level slightly anterior to middle of anal field. Soft integument of venter bears 13 to 15 pairs of medium-sized (length 14-17 μm) opisthogastric setae. Peritreme of uniform width throughout; extends anteriorly to level of middle of coxa I.

Dorsum. Dorsal shield covers almost entire dorsum; greatest width at level of setae s4; lateral sides slightly concave and converging posteriorly; posterior end broadly rounded. Usual 26 pairs of dorsal setae present, plus first 3 pairs of setae of r series (r2, r3, and r4), and 4 to 6 pairs of setae of R series, which in females are always on soft integument. Central dorsal setae small (length 11-13 μm); anterior and lateral marginal setae somewhat larger (length 14-17 μm).

Measurements. Dorsal shield length 331 μm; greatest width 192 μm. Peritreme length 156 μm. Holoventral shield length 240 μm; anterior width 76 μm; greatest width posterior to genital setae 79 μm; width at level of middle of anal field 47 μm. Length of tarsi: I - 58 μm; II - 58 μm; III - 46 μm; and IV - 62 μm. Length of movable

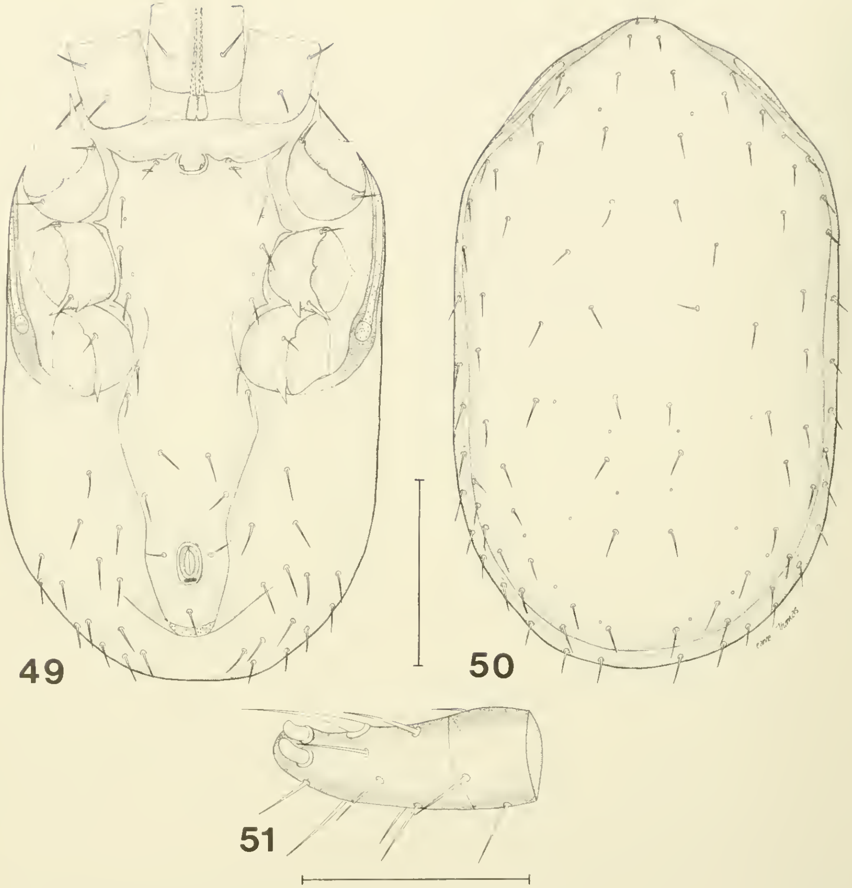

Fig. 49-51. *H. parvisoma* n. sp., male. (49) venter; (50) dorsum, scale = 100 μm; (51) ventral view of tarsus II, scale = 50 μm.

chela 27 μm; length of second cheliceral segment 70 μm.

DEUTONYMPH: Fig. 52-53.

Legs. Coxal spur formula 0-2-1-0; ventral spurs of coxae II and III small (length 3-4 μm; basal width 7-9 μm) and broadly rounded, sometimes represented only by indistinct ridge; usual leg setae present and normally developed.

Venter. Sternal shield bears 4 pairs of sternal setae and 3 pairs of pores; anterior margin slightly convex; posterior end narrowed posterior to setae st. 4 and narrowly rounded between genital setae and setae Jv1; short, angular anterolateral projections present. Anal shield small and broadly oval; paranal setae at level near anterior end of anal field. Soft integument of venter bears genital setae, plus about 21 pairs of small (length 10-12 μm) opisthogastric setae. Peritreme of uniform width throughout; extends anteriorly to level of middle of coxa I.

Dorsum. Greatest width of dorsal shield at level of setae s4; anterolateral margin concave at level of setae s2; medio- and posterolateral sides gently convex and converging posteriorly; posterior end broadly rounded. Usual 26 pairs of setae present and normally developed; all setae small to medium in length (10-14 μm),

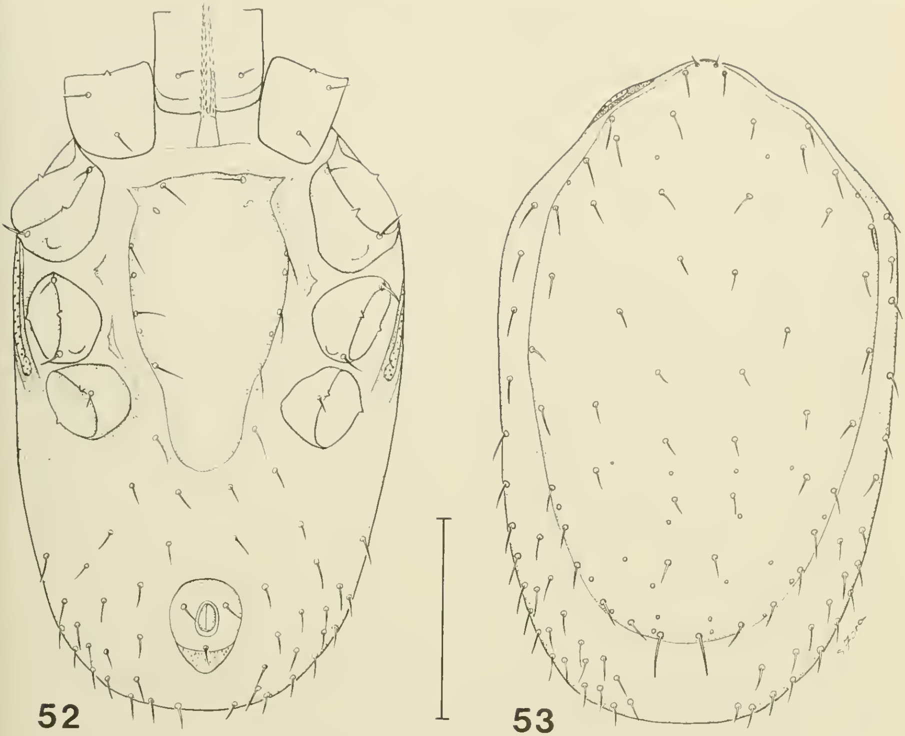

Fig. 52-53. *H. parvisoma* n. sp., deutonymph. (52) venter; (53) dorsum, scale = 100 μm.

except setae Z5 which are about two times as long (21-22 μm) as adjacent setae (s5); all 5 pairs of setae of r series and 16 to 21 pairs of setae of R series on soft integument.

Measurements. Dorsal shield length 318 μm; greatest width 187 μm. Peritreme length 148 μm; sternal shield length 152 μm; width 77 μm. Anal shield length 36 μm; greatest width 39 μm. Length of tarsi: I - 69 μm; II - 56 μm; III - 47 μm; and IV - 58 μm. Length of movable chela 31 μm; length of second cheliceral segment 75 μm.

Type material: Holotype female, one paratype female, allotype male, five paratype males, and three paratype deutonymphs (SVP-14641) from *Heteromys anomalus,* Manacal (278m), 26 km ESE Carúpano, Sucre, Venezuela, August 1, 1967, by N. E. Peterson, et al.; two paratype females (SVP-14527 and SVP-14530) from type host and locality (575m), July 27, 1967, by N. E. Peterson, et al.

Additional material examined: One female (SVP-00730) from *Heteromys anomalus,* Pico Ávila (2095m), 5km NNE Caracas, Dto. Federal, Venezuela, August 23, 1965, by M. D. and A. L. Tuttle, et al. All of the following collected by N. E. Peterson, et al.: three females (SVP-02444) nr. Isnoto (930m), 12km WNW Valera, Trujillo, Venezuela, August 27, 1965; one female (SVP-04120) from *Oryzomys minutus,* La Coromoto (3410m), 8km SE Tabay, Mérida, Venezuela, March 15, 1966; four females (SVP-13026) from *Heteromys anomalus,* Quebrada Chacaito (1170m), 3km NE Caracas, Miranda, Venezuela, May 16, 1968; one female (SVP-13651), one female (SVP-13784), six females and one male (SVP-14294) all from *Heteromys anomalus,* San Agustín (1170m, 1180m, and 1135m, respectively), 5km NW Caripe, Monagas, Venezuela, June 23, June 29, and July 15, 1967, respectively; one female (SVP-22998) from *Heteromys anomalus,* Río Socopito (470 m), 80km NW Carora, Falcón, Venezuela, May

22, 1968; and one female (SVP-03687) from *Prochimys semispinosis* nr. La Ceiba (28m), 48km WNW Valera, Trujillo, Venezuela, November 5, 1965.

Remarks: This species resembles *H. galindoi* but differs in the following characters: overall size much smaller, ventral spur of coxa II better developed, setae Jvl of females not on posterolateral margins of genital shield, and posterior end of dorsal shield in females moderately rounded rather than broad, bluntly wedge shaped.

In 7 of the 12 collections of *H. parvisoma*, specimens of *H. venezuelensis* were also recovered from the same individual host. These two species differ in several significant female characters. *H. parvisoma* is distinctly smaller in overall size; the ventral spurs of coxae II and IV are absent in *H. venezuelensis* but present in *H. parvisoma*; the sternal shield of *H. parvisoma* is considerably wider and its posterior margin more deeply concave than in *H. venezuelensis;* the posterolateral projections are present and attached to the shield in the former but not in the latter; the posterior end of the dorsal shield is distinctly more rounded in *H. parvisoma.*

Incerti Sedis

One male (SVP-23281) from *Marmosa robinsoni,* Hda. Rodeo (80m), 40km NW La Paz, Zulia, Venezuela, June 10, 1968, by N. E. Peterson, et al.

One male (SVP-15563) from *Sturnira tildae,* Belén (150m), Río Cumucumuma, T.F. Amazonas, Venezuela, January 6, 1967, by M. D. Tuttle, et al.

Hosts of Neotropical *Hirstionyssus* species

Class MAMMALIA

Order MARSUPIALIA

Family Didelphidae

Genus *Marmosa* Gray
  M. robinsoni
    H. species (male) - Venezuela

Order INSECTIVORA

Family Soricidae
Subfamily Soricinae

Genus *Cryptotis* Pomel
  C. thomasi
    H. dorsolatus n. sp. - Venezuela

Order CHIROPTERA

Suborder MICROCHIROPTERA

Family Phyllostomidae

One male (SVP-10404) from *Vampyrops oratus,* Curapao (1160m), 19km E Caracas, Miranda, Venezuela, October 10, 1966, by N. E. Peterson, et al.

The above record from the marsupial, *Marmosa robinsoni,* and the two records from bats, *Sturnira tildae* and *Vampyrops oratus,* may represent laboratory contaminations or confusion of labels.

Subfamily Glossophaginae

Genus *Anoura* Gray
  A. sp. A
    H. galindoi Strandtmann and Yunker, 1966 - Venezuela

Subfamily Carolliinae

Genus *Carollia* Gray
  C. perspicillata
    H. brachysternum n. sp. - Venezuela
    H. proctolatus n. sp. - Venezuela

Subfamily Sturnirinae

Genus *Sturnira* Gray
  S. tildae
    H. species (male) - Venezuela

Subfamily Sternoderminae

Genus *Vampyrops* Peters
  V. oratus
    H. species (male) - Venezuela

Order RODENTIA

Suborder SCIUROMORPHA

Family Sciuridae

Subfamily Sciurinae

Genus *Sciurus* Linnaeus
  S. igniventris
    H. brachysternum n. sp. - Venezuela
  S. granatensis
    H. keenani Strandtmann and Yunker, 1966 - Panamá and Venezuela
  S. variegatoides
    H. keenani Strandtmann and Yunker, 1966 - Panamá

Family Heteromyidae

Subfamily Heteromyinae

Genus *Liomys* Merriam
  L. adspersus

- *H. microchelae* Strandtmann and Yunker, 1966 - Panamá
- *L. salvini vulcani*
  - *H. brevicalcar* n. sp. - Nicaragua

Genus *Heteromys* Desmarest

- *H. heteromydis* Strandtmann and Yunker, 1966 - British Honduras
- *H. anomalus*
  - *H. keenani* Strandtmann and Yunker, 1966 - Venezuela
  - *H. parvisoma* n. sp. - Venezuela
  - *H. proctolatus* n. sp. - Venezuela
  - *H. venezuelensis* n. sp. - Venezuela
- *H. desmarestianus*
  - *H. heteromydis* Strandtmann and Yunker, 1966 - Panamá
  - *H. lunatus* Strandtmann and Yunker, 1966 - Panamá
  - *H. microchelae* Strandtmann and Yunker, 1966 - Panamá
  - *H. minutus* Strandtmann and Yunker, 1966 - Panamá
  - *H. panamensis* Strandtmann and Yunker, 1966 - Panamá

Suborder MYOMORPHA

Family Cricetidae

Subfamily Cricetinae

Genus *Oryzomys* Baird

- *O. caliginosus*
  - *H. proctolatus* n. sp. - Colombia
- *O. concolor*
  - *H. galindoi* Strandtmann and Yunker, 1966 - Venezuela
- *O. minutus*
  - *H. dorsolatus* n. sp. - Venezuela
  - *H. parvisoma* n. sp. - Venezuela

Genus *Peromyscus* Gloger

- *P. nudipes*
  - *H. galindoi* Strandtmann and Yunker, 1966 - Panamá

Genus *Rhipidomys* Tschudi

- *R. venustus*
  - *H. rhipidomys* n. sp. - Venezuela

Genus *Scotinomys* Thomas

- *S. xerampelinus*
  - *H. galindoi* Strandtmann and Yunker, 1966 - Panamá

Family Muridae

Subfamily Murinae

Genus *Rattus* G. Fischer

- *R. rattus*
  - *H. butantanensis* (Fonseca, 1932) - Venezuela
- *R. norvegicus*
  - *H. butantanensis* (Fonseca, 1932) - Brazil

Genus *Mus* Linnaeus

- *M. musculus*
  - *H. butantanensis* (Fonseca, 1932) - Brazil

Suborder HYSTRICOMORPHA

Family Echimyidae

Subfamily Echimyinae

Genus *Proechimys* J. A. Allen

- *P. semispinosus*
  - *H. parvisoma* n. sp. - Venezuela

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MALLOPHAGA OF VENEZUELAN MAMMALS

by

K. C. Emerson[1] and Roger D. Price[2]

ABSTRACT

Seven species of Mallophaga have been previously reported from Venezuelan mammals. In this paper an additional 28 species and subspecies, 7 of which are new, are reported from Venezuela; and 21 other species which have not been previously reported from Venezuela are included because their hosts are found there.

INTRODUCTION

The late F. L. Werneck, while a member of the staff of Instituto Oswaldo Cruz in Rio de Janeiro, Brazil, published a comprehensive review of the Mallophaga found on mammals throughout the world. His monumental study included considerable data on species collected in Brazil, Colombia, Guyana, and Bolivia. Because hosts do not respect national boundaries, many of those species should also occur in Venezuela. The authors have provided data and illustrations from Werneck for species not collected by Smithsonian personnel, so that the subject may be treated as completely as possible at this time. The classification followed in this paper is essentially that used by Werneck.

All new species described are based on collections made by personnel of the Smithsonian Venezuelan Project which was directed by Dr. Charles O. Handley, Jr., U.S. National Museum of Natural History, and Dr. Vernon J. Tipton, Brigham Young University.

The authors gratefully acknowledge Dr. Handley for host names and distribution; Dr. Tipton for sorting and recording data pertaining to the Mallophaga; and the 406th U.S. Army Medical Laboratory for providing the many illustrations executed by Mr. Takashi Ando, Mr. Sei Fujisawa, Mrs. Kinuyo Miyasaka, Mr. Tadashi Tanami, and Mr. Ken Utsugi.

Holotypes and allotypes of new species described in this paper are deposited in the collections of the U.S. National Museum. Paratypes, where numbers permit, will be distributed to the Universidad Central de Venezuela and to other museums.

TAXONOMY

Key to the Mallophaga of Venezuelan Mammals

1. Antennae clubbed, third segment pedunculate and often more or less concealed beneath head; with maxillary palpi 2
   Antennae filiform, exposed; without maxillary palpi 38

2. With one or two pairs of ventral spinous head processes 3
   Without ventral spinous head processes 5

3. With only one pair of ventral spinous head processes, these arising near base of maxillary palpus (Fig. 1, 2) .... *Heterodoxus spiniger* (Enderlein)
   With two pairs of ventral spinous head processes, these more laterally placed (Fig. 15, 19) 4

4. Median marginal setae of abdominal tergites and sternites of relatively uniform lengths (Fig. 19, 20); sternites with some anterior setae .... *Cummingsia intermedia* Werneck

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Median marginal setae of abdominal tergites and sternites variably short and long (Fig. 15, 16); sternites without anterior setae .... *Cummingsia peramydis* Ferris

5. With only five pairs of abdominal spiracles (none on VIII) 6
With six pairs of abdominal spiracles (present on VIII) 31

6. With two claws on each of tarsi II-III 7
With only one thin claw on each of tarsi II-III 9

7. Head uniquely shaped, with posteriorly directed processes at lateral temple and preantennal margins (Fig. 9, 10) .... *Harrisonia uncinata* Ferris
Head with lateral margins otherwise, without posteriorly directed processes 8

8. Abdominal tergites each with only single row of setae; lateral margin of head not evenly rounded (Fig. 13) .... *Hoplomyophilus nativus* Mendez
Abdominal tergites each with two rows of setae (Fig. 5, 6); lateral margin of head evenly rounded .... *Trimenopon hispidum* Ferris

9. Male 10
Female 21

10. Parameres each with three prominent long distal setae (Fig. 42, 46) 11
Parameres without such prominent long setae or with only one or two shorter distal setae 12

11. Terminal paramere seta much longer than others (Fig. 46); median genital sac sclerite tapered to fine point .... *Gliricola venezuelanus,* n. sp.
Terminal paramere seta subequal to others (Fig. 42); median genital sac sclerite bluntly rounded .... *Gliricola pintoi* Werneck

12. Abdominal sternal setae generally stout (Fig. 36); genitalia with short, narrow basal plate and unique inwardly curved parameres (Fig. 38) .... *Gliricola mirandai* Werneck
Abdominal sternal setae finer; genitalia with typical elongate, wide basal plate and parameres shaped or directed otherwise 13

13. Genital sac with many median sclerites (Fig. 30) .... *Gliricola lindolphoi* Werneck
Genital sac either without or with only single evident sclerite 14

14. Genital sac without evident sclerite 15
Genital sac with median sclerite 16

15. Last abdominal segment with two longer setae each side (Fig. 32) .... *Gliricola decurtatus marajoensis* Werneck
Last abdominal segment with only one longer seta each side (Fig. 24) .... *Gliricola porcelli* (Schrank)

16. Parameres with distinct terminal barb 17
Parameres without distinct terminal barb 19

17. Last abdominal segment with one very long seta each side, this being much longer than length of last tergite (Fig. 48); parameres slender, outwardly curved (Fig. 50) .... *Gliricola echimydis* Werneck
Last abdominal segment with one medium seta each side, shorter than length of last tergite; parameres usually either broader or straighter than above 18

18. Pleurite VIII each with two very long setae (Fig. 64); large lice, over 1.30 mm long; large genitalia (Fig. 66), over 0.40 mm long and 0.10 mm wide .... *Gliricola tiptoni,* n. sp.
Pleurite VIII each with only one very long seta (Fig. 68); small lice, under 1.20 mm long; small genitalia (Fig. 70), under 0.35 mm long and 0.10 mm wide .... *Gliricola mendezi,* n. sp.

19. Last segment with only minute setae (Fig. 60); pleurite VIII each with only one long seta; genitalia with irregularly curved expanded parameres (Fig. 62) .... *Gliricola handleyi,* n. sp.

Last segment with stout medium terminal seta on each side; pleurite VIII each with two longer setae; genitalia with evenly curved tapered parameres 20

20. Genital sclerites as in Fig. 54; large lice, over 1.17 mm long (Fig. 52) ..... *Gliricola wenzeli*, n. sp.

Genital sclerites as in Fig. 58; small lice, under 1.17 mm long (Fig. 56) ..... *Gliricola vogelsangi* Werneck

21. Tergite III with markedly convex posterior portion dovetailed into tergite IV (Fig. 43) ..... *Gliricola venezuelanus*, n. sp.

Tergite III with essentially straight posterior border 22

22. Median three setae on each side of ventral anteriormost terminalia row normal, slender, not spatulate (Fig. 33, 37, 59) 23

At least some to all of such setae distinctly flattened, spatulate 25

23. None of pleurites II-VII with conspicuously longer setae (Fig. 31) ..... *Gliricola decurtatus marajoensis* Werneck

At least pleurites V-VII each with longer, heavier setae 24

24. Sternal setae minute (Fig. 59); pleurite IV with heavier, longer seta; median four setae on each side of ventral anteriormost terminalia row including one much longer seta (Fig. 61) ..... *Gliricola handleyi*, n. sp.

Sternal setae longer, heavier (Fig. 35); pleurite IV without longer seta; median four setae on each side of ventral anteriormost terminalia row all subequal (Fig. 37) ..... *Gliricola mirandai* Werneck

25. Last tergite without longer seta at posterior margin (Fig. 55) ..... *Gliricola vogelsangi* Werneck

Last tergite with distinctly longer seta at posterior margin 26

26. Longest terminal seta shorter than length of last segment (Fig. 23, 27) ..... *Gliricola lindolphoi* Werneck
Gliricola porcelli (Schrank)

Longest terminal seta longer than length of last segment 27

27. Pleurite VIII each with two longer setae 28

Pleurite VIII each with only one longer seta 30

28. Pleurites V-VI without longer, heavier setae (Fig. 63) ..... *Gliricola tiptoni*, n. sp.
Gliricola wenzeli, n. sp. (in part)

Pleurites V-VI each with longer, heavier setae 29

29. Large lice, over 1.30 mm long (Fig. 51) ..... *Gliricola wenzeli*, n. sp. (in part)

Small lice, under 1.25 mm long (Fig. 39) ..... *Gliricola pintoi* Werneck

30. Large lice, over 1.25 mm long (Fig. 67) ..... *Gliricola mendezi*, n. sp.

Small lice, under 1.20 mm long (Fig. 47) ..... *Gliricola echimydis* Werneck

31. Ventral head with more than 12 long setae (Fig. 99, 100); female with dense groups of long setae on tergites III-IV and with only a few median setae on tergites VI-VIII; male with large distinctive genitalia (Fig. 102) ..... *Aotiella aotophilus* (Ewing)

Ventral head with no more than six or so long setae; female without groups of long setae on tergites III-IV, and with more setae distributed across tergites VI-VIII; male genitalia otherwise 32

32. Very large lice (Fig. 83, 84), head width over 0.60 mm and total length over 3.50 mm ..... *Macrogyropus dicotylis* (Macalister)

Much smaller lice, with head width under 0.50 mm and total length under 3.00 mm 33

33. Abdominal tergites and sternites with both long and short setae, longer ones reaching to alveoli of those of following segment 34

Abdominal tergites and sternites with uniformly short setae, none extending to alveoli of those of following segment 35

34. Most lateral abdominal tergal setae distinctly shorter than median ones (Fig. 75, 76); male genitalia with long parameres and sclerites as in Fig. 78 .... *Gyropus wernecki*, n. sp.
Lateral abdominal tergal setae almost as long as median ones (Fig. 79, 80); male genitalia with very short parameres and sclerites as in Fig. 82 .. *Gyropus thompsoni* Werneck

35. Large lice (Fig. 95, 96), with head width over 0.35 mm and total length over 1.90 mm; male with large genitalia, over 0.15 mm wide, and with tapered, even-sided, blunt parameres (Fig. 98) .... *Macrogyropus costalimai* (Werneck)
Small lice, with head width under 0.35 mm, and total length under 1.90 mm; male with small genitalia, under 0.12 mm wide, and with irregular or sharply pointed parameres 36

36. Abdominal tergites and sternites with double row of setae (Fig. 71, 72); male genitalia with large, pointed parameres and coarse, heavy spination on sac (Fig. 74) .... *Gyropus ovalis* Burmeister
Abdominal tergites and sternites with single row of setae; male genitalia with irregular small parameres and uniformly fine spination on sac 37

37. Small lice (Fig. 91, 92); female head width under 0.34 mm, and total length under 1.90 mm; male genitalia (Fig. 94) under 0.55 mm long, and 0.13 mm wide .... *Macrogyropus amplexans longisetis* Werneck
Large lice (Fig. 87, 88); female head width over 0.34 mm, and total length over 1.90 mm; male genitalia (Fig. 90) over 0.55 mm long, and 0.13 mm wide .... *Macrogyropus amplexans amplexans* (Neumann)

38. With zero to three pairs of abdominal spiracles 39
With six pairs of abdominal spiracles 47

39. With spiracles on abdominal segments III-IV or III-V 40
Without abdominal spiracles 43

40. Lateroanterior margin of head essentially straight, converging to shallow medioanterior depression (Fig. 147, 148) .... *Felicola subrostratus* (Burmeister)
Anterior margin of head more or less evenly rounded 41

41. Abdominal tergites with distinct row of short setae (Fig. 143, 144); male genitalia with very long, slender parameres (Fig. 146) .... *Suricatoecus quadraticeps* (Chapman)
Abdominal tergites with sparse setae, most with not over three setae on each side; male genitalia with shorter, broader parameres (Fig. 130, 142) 42

42. Abdominal tergites with lateral setae much shorter than median setae (Fig. 139, 140) .... *Trichodectes potus* Werneck
Abdominal tergites with lateral setae as long as median setae (Fig. 127, 128) .... *Trichodectes fallax* Werneck

43. Very large lice (Fig. 103, 104), with head width over 0.80 mm, and total length over 2.40 mm .... *Lymeon gastrodes* (Cummings)
Smaller lice, with head width under 0.70 mm, and total length under 2.10 mm 44

44. Female subgenital plate with median posteriorly directed elongated portion fringed with evenly spaced setae on each side (Fig. 125); male genitalia with triangular, undivided endomeral plate, and parameral arch rounded apically (Fig. 126) .... *Trichodectes barbare* Neumann
Female subgenital plate without prolongation as above, and with short to long setae transversely across plate; male genitalia with apically divided endomeral plate and parameral arch with apical pointed process 45

45. Very small lice, with total length under 1.40 mm; female subgenital plate with only one very long median seta each side (Fig. 109); male genital sac with heavy, large spinules (Fig. 110) .... *Neotrichodectes minutus* (Paine)
Larger lice, with total length over 1.50 mm; female subgenital plate with cluster of long median setae each side; male genital sac with finer, smaller spinules 46

46. Female gonapophyses rounded, with setae along anterior but not medial margin (Fig. 113); male genitalia with parameral arch not extending beyond endomeral plate (Fig. 114) .... *Neotrichodectes pallidus* (Piaget)
Female gonapophyses angulate, with setae along medial margin (Fig. 117); male genitalia with parameral arch extending beyond endomeral plate by approximately length of plate (Fig. 118) .... *Neotrichodectes semistriatus*, n. sp.

47. Anterior margin of head more or less evenly rounded 48
Anterior margin of head angulate, due to fairly straight converging sides, and flat to concave median portion 54

48. Most abdominal tergites without large conspicuous plates; head generally wider than long 49
Most abdominal tergites with large conspicuous median plate; head about as wide as long 51

49. Majority of abdominal tergites and sternites with more than 1 row of setae (Fig. 135, 136) .... *Trichodectes ferrisi* Werneck
All abdominal tergites with only one row of setae 50

50. Female ventral terminalia as in Fig. 133; male genitalia with slender parameres (Fig. 134) .... *Trichodectes galictidis* Werneck
Female ventral terminalia as in Fig. 121; male genitalia with broad parameres (Fig. 122) .... *Trichodectes canis* (DeGeer)

51. Female with inner margin of gonapophyses virtually straight (Fig. 205); male genitalia as in Fig. 206 .... *Bovicola equi* (Linnaeus)
Female with inner margin of gonapophyses having projection or lobe; male genitalia otherwise 52

52. Dorsum of head with sparse setae (Fig. 193, 194); male genitalia as in Fig. 196 .... *Bovicola caprae* (Gurlt)
Dorsum of head with numerous setae (Fig. 197, 199); male genitalia otherwise 53

53. Female with inner margin of gonapophyses having large lobe (Fig. 201); male genitalia as in Fig. 202 .... *Bovicola ovis* (Linnaeus)
Female with inner margin of gonapophyses having small lobe (Fig. 198); male genitalia otherwise; male rare .... *Bovicola bovis* (Linnaeus)

54. Head with deep narrow medioanterior notch 55
Head lacking such deep notch 57

55. Head with unusual rounded projection on either side of medioanterior notch (Fig. 155, 156) .... *Cebidicola armatus* (Neumann)
Head without such projection associated with medioanterior notch 56

56. Female last tergite and subgenital plate with only very short setae (Fig. 159, 161); male genitalia as in Fig. 162 .... *Cebidicola semiarmatus* (Neumann)
Female last tergite and medioposterior margin of subgenital plate with longer setae (Fig. 163, 165); male genitalia as in Fig. 166 .... *Cebidicola extrarius* Werneck

57. Male genitalia without separated parameres, but with fused parameral arch and median bifurcate endomeral plate; abdomen either elongate, parallel-sided, and head broad anteriorly, or, if abdomen rounded and head tapered, total length under 1.35 mm 58
Male genitalia with separated parameres; abdomen and head variable, but usually with more rounded abdomen and total length over 1.40 mm 61

58. Head tapered anteriorly (Fig. 151, 152); abdomen rounded; small lice, under 1.35 mm long .... *Felicola felis* (Werneck)
Head broad anteriorly; abdomen more or less parallel sided; larger lice, over 1.70 mm long 59

59. Small lice (Fig. 207, 208), under 2.00 mm long; male with widely bifurcate endomeral plate (Fig. 210) and without paired tergal plates .... *Tricholipeurus albimarginatus* Werneck

Large lice, over 2.00 mm long; male with narrowly bifurcate endomeral plate and with paired tergal plates 60

60. Small lice, under 2.30 mm long; male genitalia with parameral arch lacking prominent medioposterior projection (Fig. 218) .... *Tricholipeurus parallelus* (Osborn)

Large lice, over 2.35 mm long; male genitalia with parameral arch having prominent medioposterior projection (Fig. 214) .... *Tricholipeurus lipeuroides* (Megnin)

61. Head sharply tapered, with narrow medioanterior notch 62

Head anteriorly broadly flattened to slightly concave, without definite notch 63

62. Male genitalia with sharply tapered parameres, apically curved inward (Fig. 188); tergites III-IV with only very small accessory plate posterior to principal plate (Fig. 187); female unknown .... *Eutrichophilus comitans* Werneck

Male genitalia with parameres blunt, apically curved outward (Fig. 186); tergites III-IV with large prominent accessory plate posterior to principal plate (Fig. 184) .... *Eutrichophilus lobatus* Ewing

63. Female over 2.60 mm long; male with accessory plate only on tergite VII; genitalia as in Fig. 178, with sharply tapered parameres .... *Eutrichophilus guyanensis* Werneck

Female under 2.40 mm long; male either without accessory plate or with such plate present on more than tergite VII; genitalia otherwise 64

64. Female with very large prominent gonapophyses and with posteriorly pointed subgenital plate (Fig. 191); male without accessory tergal plates (Fig. 190) and with genitalia as in Fig. 192 .... *Eutrichophilus minor* Mjöberg

Female with smaller gonapophyses and with subgenital plate shaped otherwise; male with at least three accessory tergal plates and genitalia otherwise 65

65. Male with only three small accessory tergal plates (on V-VII) and genitalia as in Fig. 182, with slender transverse sclerite; female under 1.80 mm long, with ventral terminalia as in Fig. 181 .... *Eutrichophilus exiguus* Werneck

Male with four or six large accessory tergal plates (on III-VI or II-VII), and genitalia as in Fig. 170 or 174; female over 1.85 mm long, with ventral terminalia as in Fig. 169 or 173 66

66. Male under 2.30 mm long, with six accessory tergal plates (on II-VII), and genitalia as in Fig. 174; female with last tergite complete across segment and with ventral terminalia as in Fig. 173 .... *Eutrichophilus cordiceps* Mjöberg

Male over 2.30 mm long, with only four accessory tergal plates (on III-VI), and genitalia as in Fig. 170; female with last tergite medially divided and with ventral terminalia as in Fig. 169 .... *Eutrichophilus cercolabes* Mjöberg

Family Boopidae

Genus *Heterodoxus* LeSouëf and Bullen

Heterodoxus LeSouëf and Bullen, 1902:159.

Type-species: *Heterodoxus macropus* Le Souëf and Bullen, 1902.

Heterodoxus spiniger (Enderlein)
(Fig. 1-4)

Menopon spiniger Enderlein, 1909:80, Pl. 8, Fig. 4-5.

Menopon (*Menacanthus*) *spinigerum* Neumann, 1912b:364, Fig. 12.

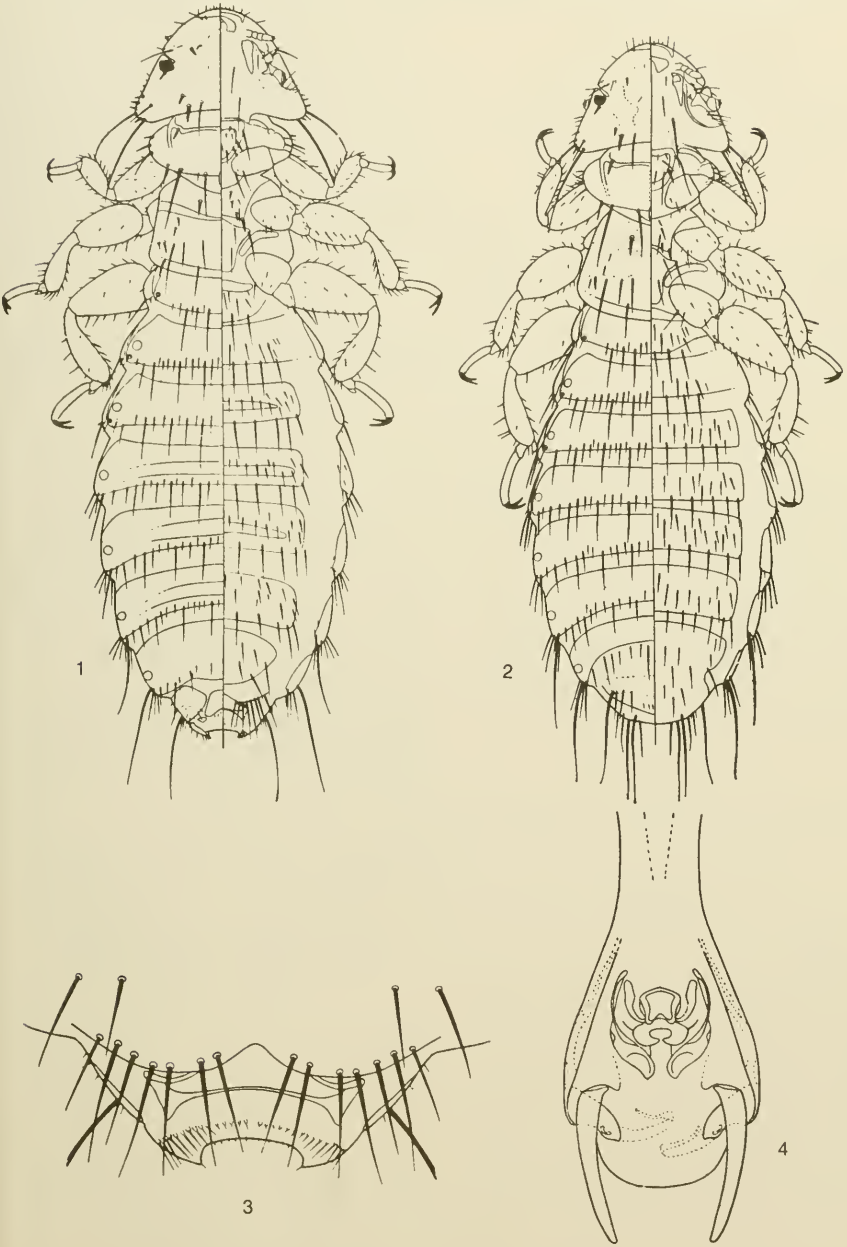
Menopon armiferus Paine, 1912a:362, Fig. A-D.

The holotype was collected off a domestic dog (*Canis familiaris* Linnaeus) in the Kalahari Desert in southern Africa. It has since been recorded from domestic dogs in Australia, North America, South America, and Africa. It has been taken also from coyotes and foxes in several localities in North America.

Venezuelan Records

Werneck (1948) recorded it off a domestic dog collected at Zaraza, **Guarico,** Venezuela. Stafford (1943) also recorded it off a domestic dog in Venezuela, but no specific locality was given.

Fig. 1-4. *Heterodoxus spiniger* (Enderlein), from *Canis familiaris.* From Werneck, 1936:1, dorsal-ventral view of female; 2, dorsal-ventral view of male; 3, ventral view of female terminalia; 4, male genitalia.



Comments. This common parasite of domestic dogs is probably widespread in Venezuela.

Family Trimenoponidae

Genus *Trimenopon* Cummings

Trimenopon Cummings, 1913:39. Type-species: *Trimenopon echinoderma* Cummings, 1913.

Trimenopon hispidum (Burmeister)
(Fig. 5-8)

Gyropus hispidus Burmeister, 1838:443.

Menopon jenningsi Kellogg and Paine, 1910:461, Fig. 1.

Trimenopon echinoderma Cummings, 1913:40, Fig. 4.

Menonpon extraneum Galliard, 1934:1318, Fig. A (*nec* Piaget, 1880).

Trimenopon rozeboomi Emerson, 1940:339, Fig. 1-4.

The holotype was collected off a skin of "*Bradypus tridactylus*," which was most likely a contamination, as the true host is the guinea pig, *Cavia porcellus* (Linnaeus). It has been recorded off laboratory guinea pigs in Panama, Brazil, Peru, Russia, and Yugoslavia. It has also been recorded by Werneck (1948) off wild *C. porcellus* in Brazil and Paraguay, *C. aperea* Erxleben in Brazil, *C. rufescens* Lund in Brazil, *C. fulgida* Wagler in Brazil, *C. anolaimae* J. A. Allen in Colombia, and *C. azarae* Lichtenstein in Paraguay. This species probably occurs in Venezuela, but has not been reported there.

Genus *Harrisonia* Ferris

Harrisonia Ferris, 1922:80. Type-species: *Harrisonia uncinata* Ferris, 1922.

Harrisonia uncinata Ferris
(Fig. 9-12)

Harrisonia uncinata Ferris, 1922:81, Fig. 2e, 3c, 4d, and 6.

The holotype was taken off a skin of *Hoplomys gymnurus* (Thomas) collected at San Javier, Ecuador. Ferris also recorded it from the same locality off *Proechimys semispinosus* Tomes and *Nelomys mirae* Thomas (= *Tylomys mirae*). Werneck (1948) recorded it off *P. trinitatis* Allen and Chapman from Princeton, Trinidad. Emerson (1966) recorded it off *P. semispinosus* from many localities in Panamá. The authors have also seen specimens collected off *P. semispinosus* from **Heredia**, **Limón** and **San José** provinces in Costa Rica and off *P. trinitatis* from Cumaca, Trinidad.

Venezuelan Records

H. uncinata was taken off 23 specimens of *Proechimys semispinosus* collected at Urama, **Yaracuy** and **Carabobo**; Boca Mavaca, Capibara, and Tamatama, **T.F. Amazonas**; Manacal, **Sucre**; and Kasmera, **Zulia**. It was also taken off 5 specimens of *P. guyannensis* (E. Geoffroy) collected at El Manaco, **Bolívar**; Belén, and San Juan Rió Manapiare, **T. F. Amazonas**.

Comments. One host had 20 specimens, but most had fewer than five lice. *Harrisonia* is a monotypic genus.

Genus *Hoplomyophilus* Mendez

Hoplomyophilus Mendez, 1967:289. Type-species: *Hoplomyophilus nativus* Mendez, 1967.

Hoplomyophilus nativus Mendez
(Fig. 13-14)

Hoplomyophilus nativus Mendez, 1967:289, Fig. 1-4.

The holotype was taken off *Hoplomys gymnurus* (Thomas) collected at Cerro Azul, Panama. Mendez also recorded it off the same host collected at Isla Escudo de Veraguas, Camp Pina, and Rio Changena, Panama. Emerson (1971) recorded it off the same host collected at El Recreo, **Zelaya**, Nicaragua.

Venezuelan Records

One male was taken off a specimen of *Proechimys semispinosus* Tomes collected at Urama, **Yaracuy** and **Carabobo.**

Comments. *Hoplomyophilus* is a monotypic genus.

Genus *Cummingsia* Ferris

Cummingsia Ferris, 1922:83. Type-species: *Cummingsia maculata* Ferris, 1922.

The genus contains three species, two of which have been collected in Venezuela.

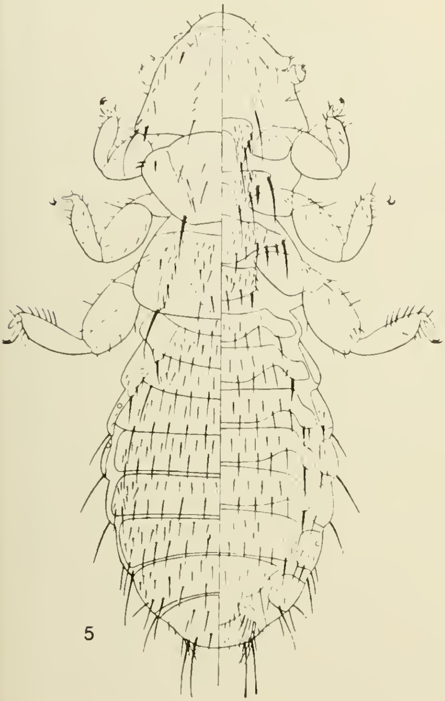
Cummingsia peramydis Ferris
(Fig. 15-18)

Cummingsia peramydis Ferris, 1922:85, Fig. 2D, 3E, 4C, 8.

Acanthomenopon horridum Harrison, 1922:156, Fig. 1e, 2.

The holotype was taken off a skin of *Peramys domesticus* (Wagner) (= *Monodelphis domestica*) collected at Quixada, Ceará, Brazil. Harrison recorded it off *Peramys* sp. (= *Mono-*

Fig. 5-8. *Trimenopon hispidum* (Burmeister), from *Cavia porcellus.* From Werneck, 1936:5, dorsal-ventral view of female; 6, dorsal-ventral view of male; 7, ventral view of female terminalia; 8, male genitalia.



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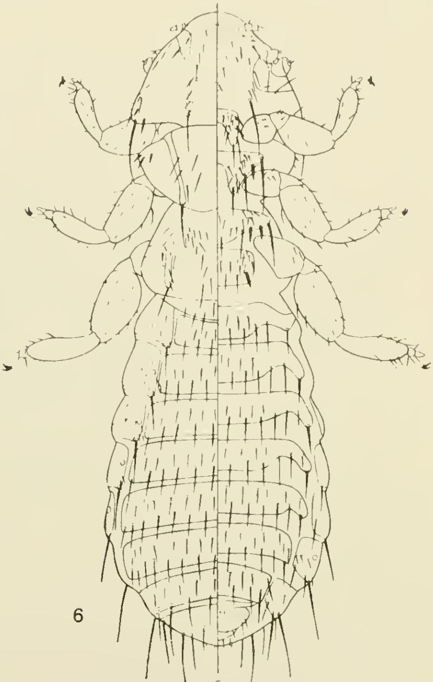

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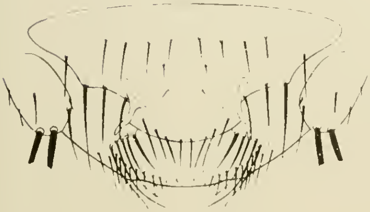

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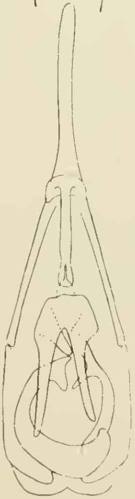

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Fig. 9-12. *Harrisonia uncinata* Ferris, from *Proechimys semispinosus*, Yaracuy: 9, dorsal-ventral view of female; 10, dorsal-ventral view of male; 11, ventral view of female terminalia; 12, male genitalia.

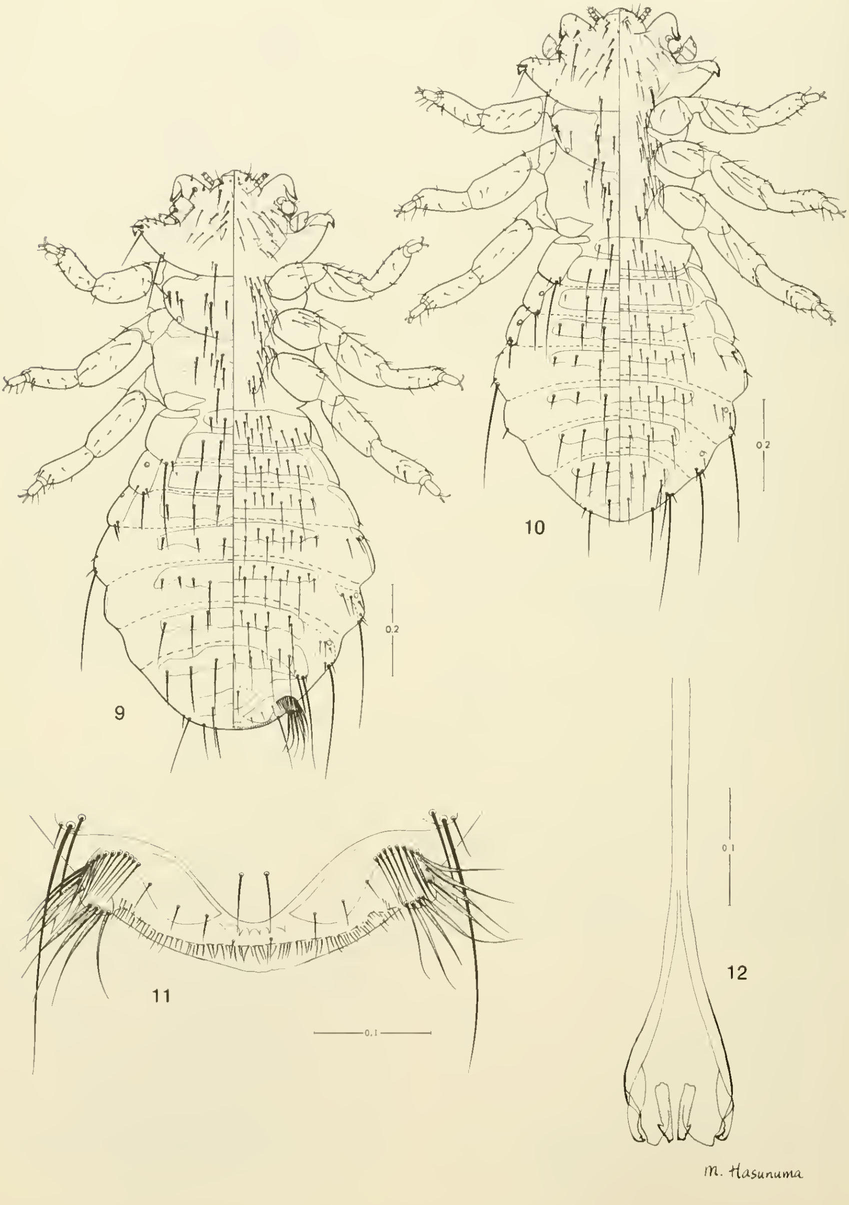

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Fig. 13-14. *Hoplomyophilus nativus* Mendez, from *Proechimys semispinosus*, Yaracuy and Carabobo: 13, dorsal-ventral view of male; 14, male genitalia.

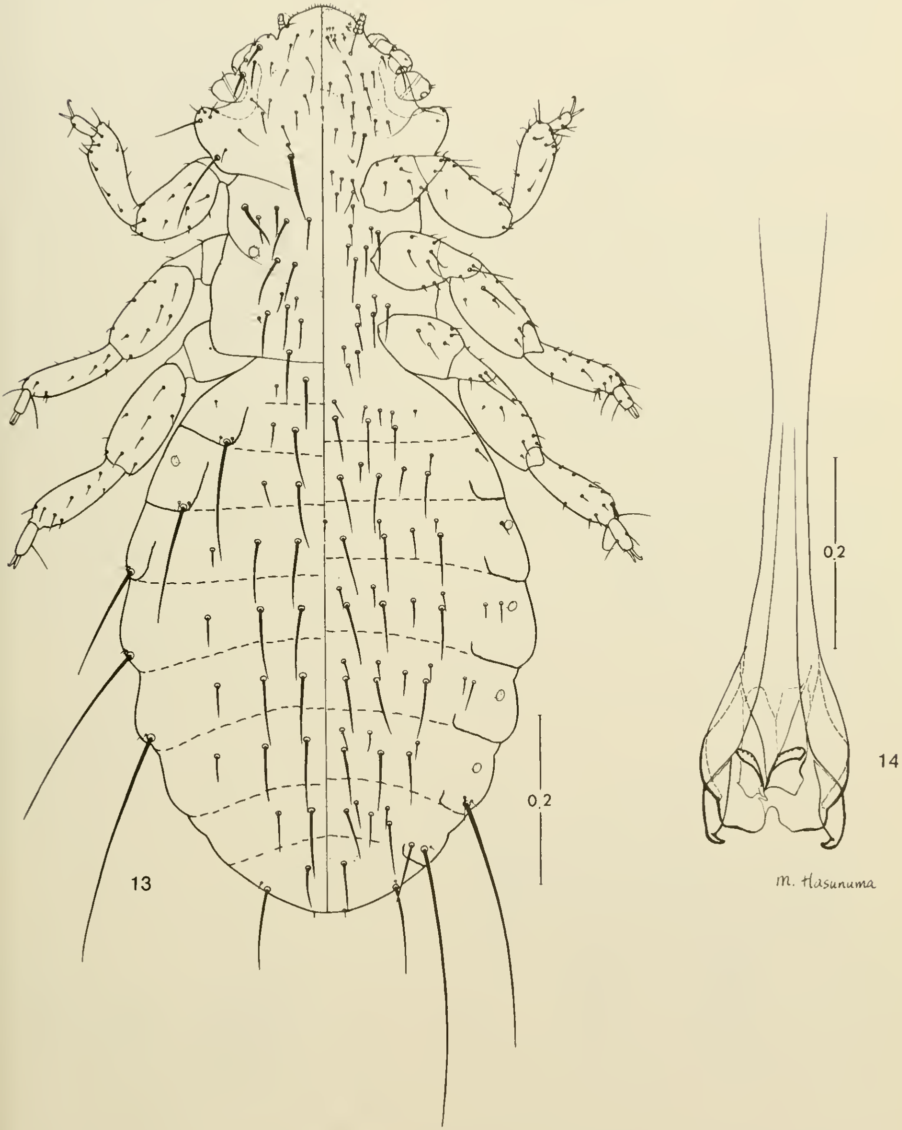
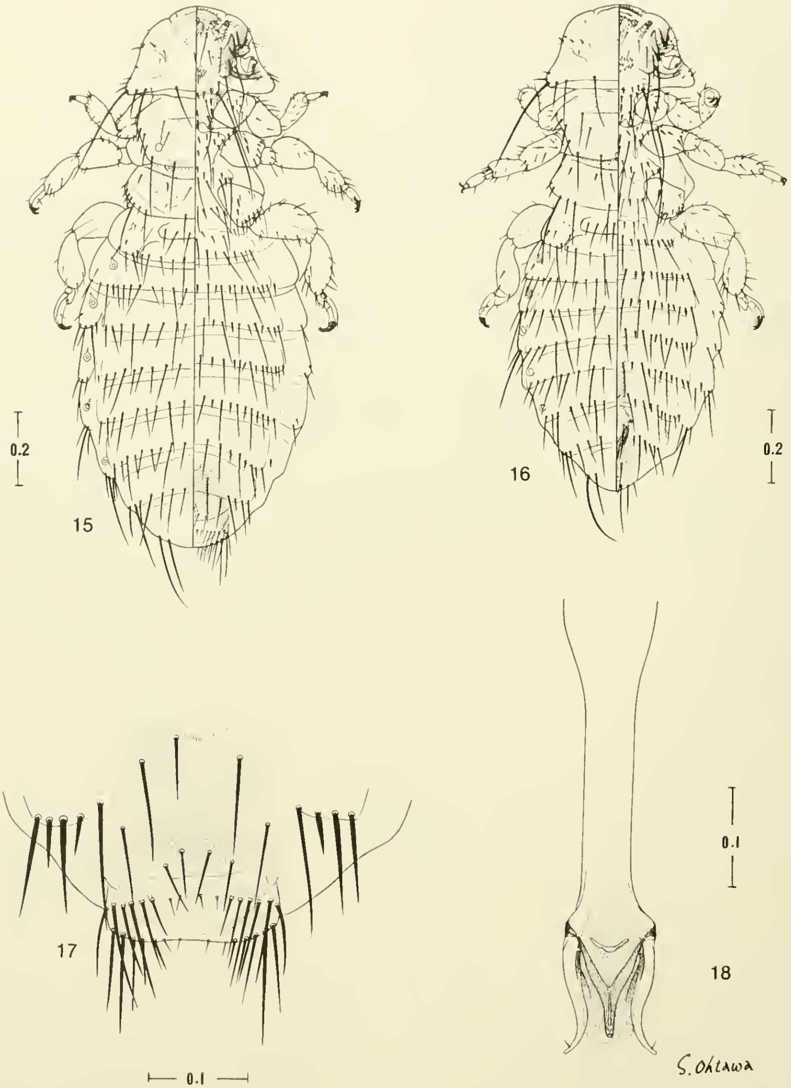


Fig. 15-18. *Cummingsia peramydis* Ferris, from *Monodelphis brevicaudata,* Trujillo: 15, dorsal-ventral view of female; 16, dorsal-ventral view of male; 17, ventral view of female terminalia; 18, male genitalia.



delphis sp.) collected at Bahia, Brazil. Werneck (1948) recorded it off *P. domesticus* (*Monodelphis domestica*) from Pará and **Pernambuco,** Brazil.

Venezuelan Records

C. peramydis was taken off 13 specimens of *Monodelphis brevicaudata* (Erxleben) collected at Isnoto and El Dividive, **Trujillo;** Mirimire and La Pastora, **Falcón;** Tamatama, T. F. **Amazonas;** Altamire, **Barinas;** and near Icabarú, **Bolívar.**

Comments. There were 31 specimens on one host and more than 20 specimens on two other hosts. The remaining infestations were light.

Cummingsia intermedia Werneck
(Fig. 19-22)

Cummingsia intermedia Werneck, 1937:70, Fig. 1-6.

The holotype was taken off *Marmosa incana paulensis* Tate collected in **Rio de Janeiro,** Brazil. The species has not been reported since the original record.

Venezuelan Records

C. intermedia was taken off three specimens of *Marmosa dryas* Thomas collected at Hda. Misisí, **Trujillo;** and Tabay, **Merida.**

Comments. One host had three specimens, another two, and the third only one.

Family Gyropidae

Genus *Gliricola* Mjöberg

Micropus Denny, 1842:247 (*nec* Meyer and Wolf, 1810).

Gliricola Mjöberg, 1910:292.

Paragliricola Ewing, 1924:29.

Type-species: *Gyropus gracilis* Nitzsch, 1818.

Gliricola porcelli (Schrank)
(Fig. 23-26)

Pediculus porcelli Schrank, 1781:500, Pl. I, Fig. 1.

Pediculus saviae Schrank, 1803:186.

Pediculus bifurcatus Olfers, 1816:83.

Gyropus gracilis Nitzsch, 1818:304.

Gyropus porcelli perfoliatus Neumann, 1912a: 216.

Gyropus bicaudatus Paine, 1912b:441, Pl. 20, Fig. 3.

Gliricola perfoliata Harrison, 1916:32.

The holotype was collected off a laboratory guinea pig, *Cavia porcellus* (Linnaeus). It is found worldwide on that host. Werneck (1948) also recorded it off wild *C. porcellus* in Brazil, *C. aperea* Erxleben in Brazil and Paraguay, *C. fulgida* Wagler in Brazil, *C. rufescens* Lund in Brazil, and *C. cutleri* Bennett in Peru.

Venezuelan Records

G. porcelli was taken off 12 specimens of wild *Cavia porcellus* from San Agustín, and San Fernando, **Monagas;** and near Montalbán, **Carabobo.**

Comments. The four most heavily infested hosts had 84, 80, 44, and 35 specimens, respectively, while the others had a smaller number.

Gliricola lindolphoi Werneck
(Fig. 27-30)

Gliricola lindolphoi Werneck, 1942:302.

The holotype was collected off *Cavia aperea* Erxleben at Santo Amaro, **São Paulo,** Brazil. Werneck (1948) also reported it off the domestic guinea pig.

Venezuelan Records

G. lindolphoi was taken off two specimens of *Cavia porcellus* (Linnaeus) near Caripe, **Monagas.**

Comments. One host had one female of this species and the other had three males and three females. The female of this species closely resembles that of *G. porcelli.* Since *G. lindolphoi* and *G. porcelli* were not taken off the same host specimens, it is believed that the females illustrated are properly identified.

Gliricola decurtatus marajoensis Werneck
(Fig. 31-34)

Gliricola decurtatus marajoensis Werneck, 1942: 310, Pl. 2, Fig. C.

The holotype was collected off *Loncheres armatus* I. Geoffroy (*Echimys armatus*) in **Pará,** Brazil. Werneck (1948) also reported it off the type-host collected from three other localities in Brazil. Other subspecies of *Gliricola decurtatus* are recorded from a variety of hosts in Brazil. We have been unable to examine Werneck's types. However, based upon his descriptions and illustrations, the specimens listed are appropriately referred to this species.

Venezuelan Records

G. decurtatus marajoensis was taken off 4 specimens of *Echimys armatus* (I. Geoffroy) collected at Hato Mata de Bejuco, **Monagas**

Fig. 19-22. *Cummingsia intermedia* Werneck, from *Marmosa dryas*, Trujillo: 19, dorsal-ventral view of female; 20, dorsal-ventral view of male; 21, ventral view of female terminalia; 22, male genitalia.

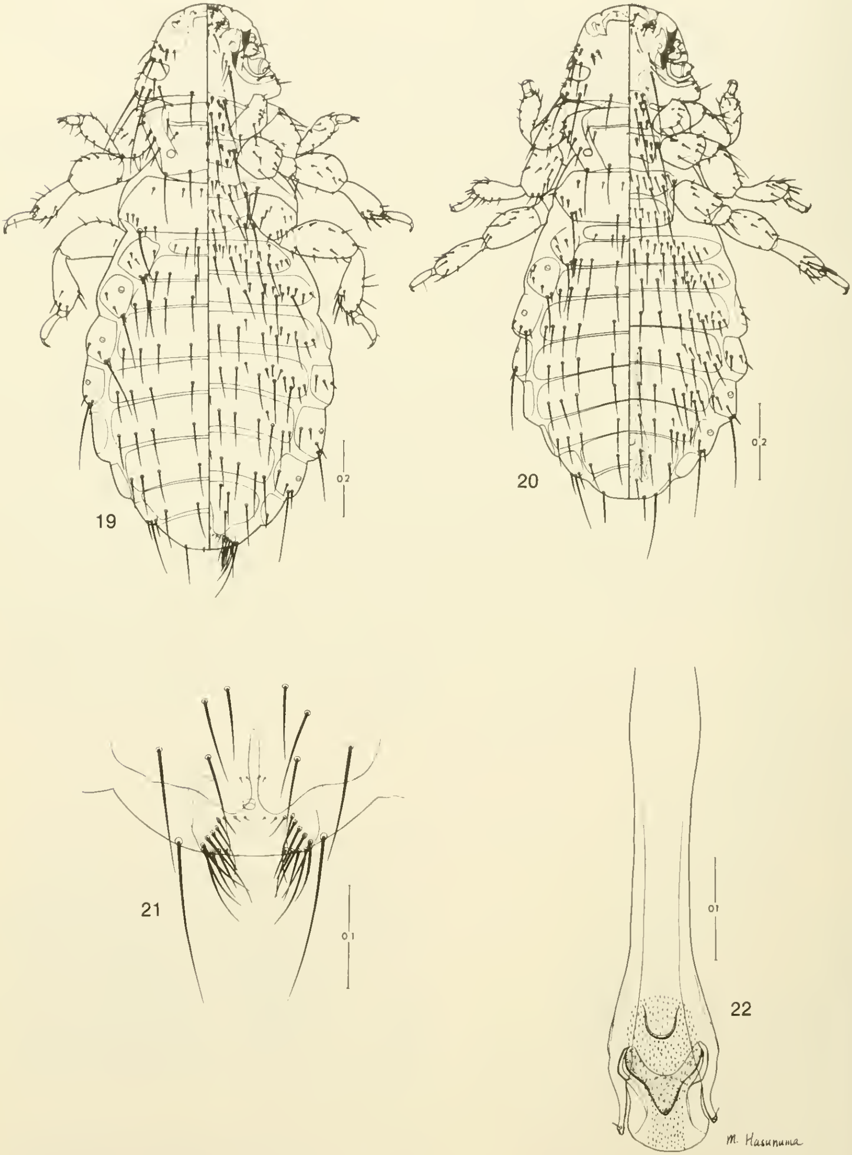
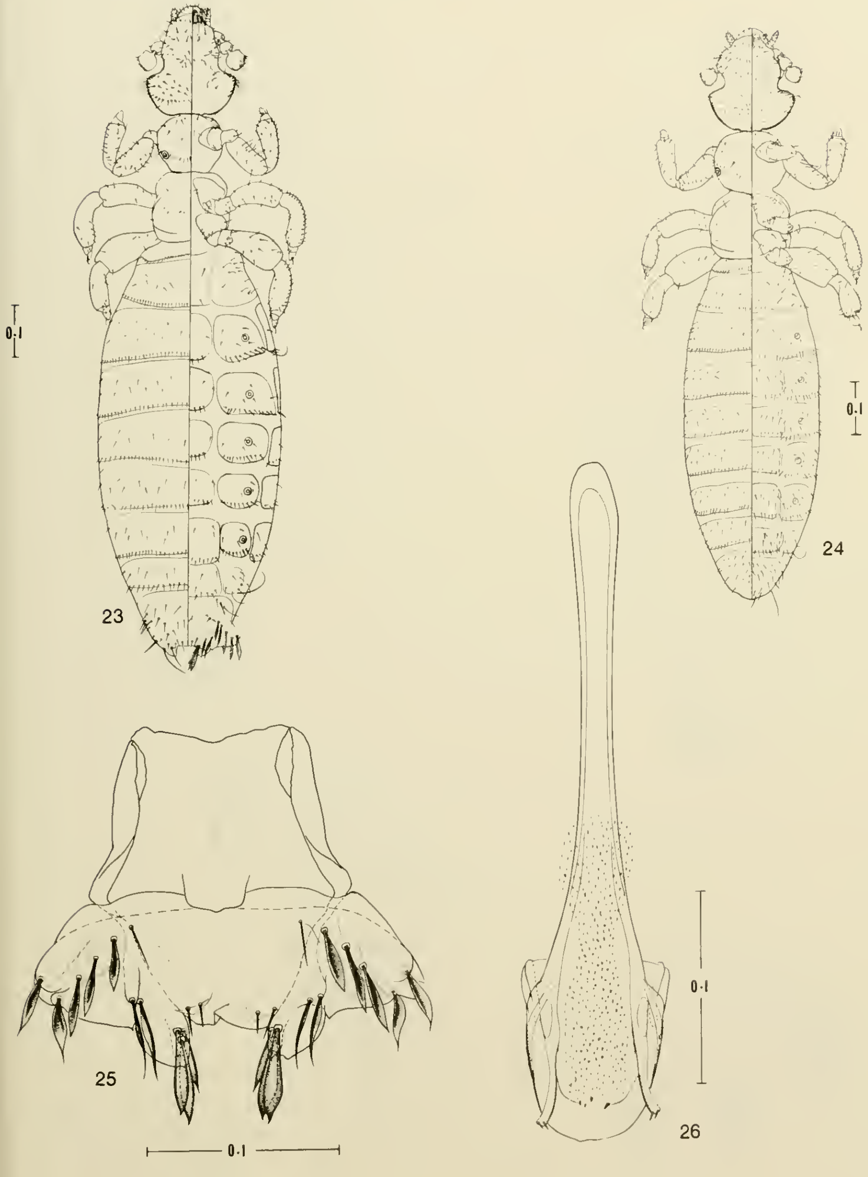
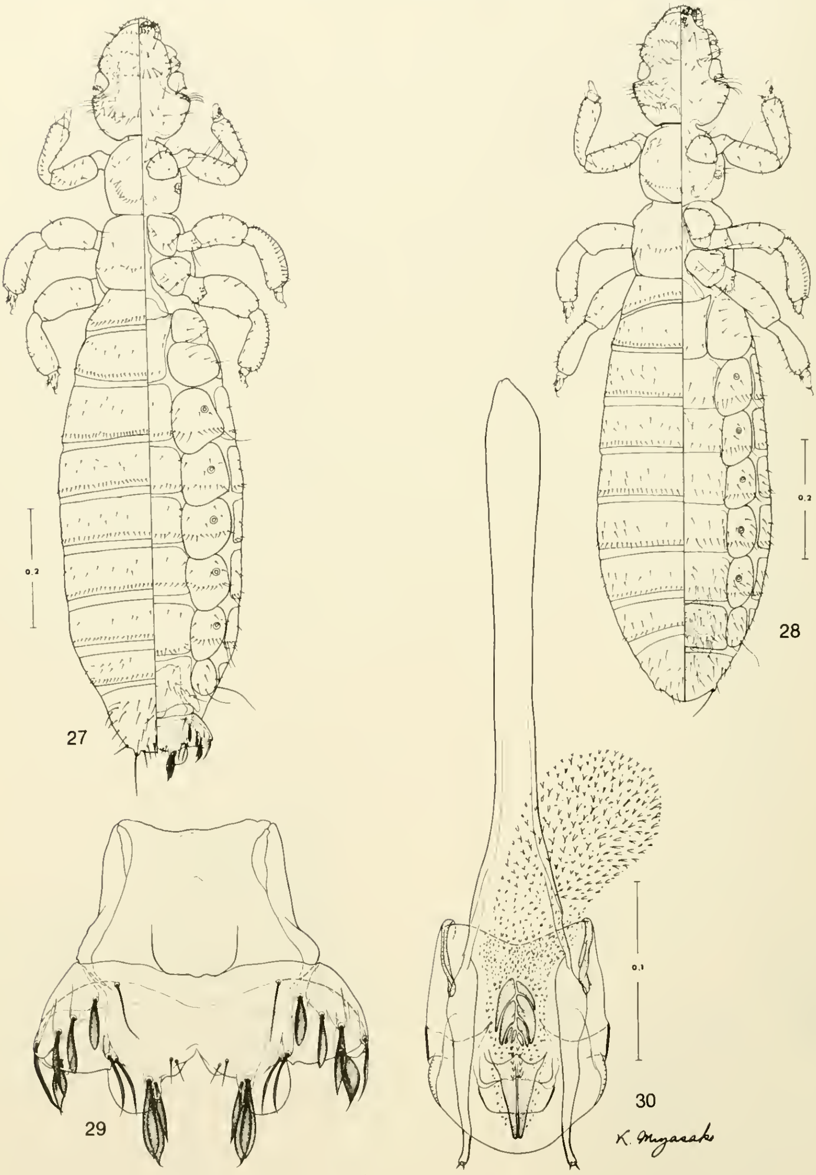


Fig. 23-26. *Gliricola porcelli* (Schrank), from *Cavia porcellus*, Monagas: 23, dorsal-ventral view of female; 24, dorsal-ventral view of male; 25, ventral view of female terminalia; 26, male genitalia.



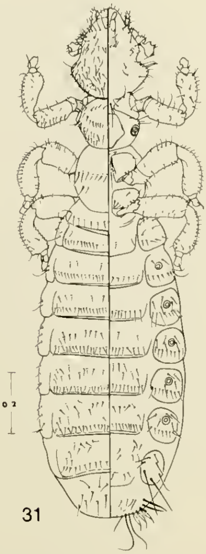
S. Ohtawa

Fig. 27-30. *Gliricola lindolphoi* Werneck, from *Cavia porcellus*, Monagas: 27, dorsal-ventral view of female; 28, dorsal-ventral view of male; 29, ventral view of female terminalia; 30, male genitalia.



K. Miyasaki

Fig. 31-34. *Gliricola decurtatus marajoensis* Werneck, from *Echimys semivillosus*, Lara: 31, dorsal-ventral view of female; 32, dorsal-ventral view of male; 33, ventral view of female terminalia; 34, male genitalia.



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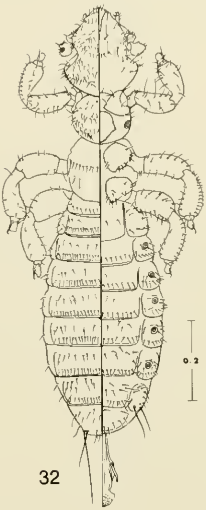

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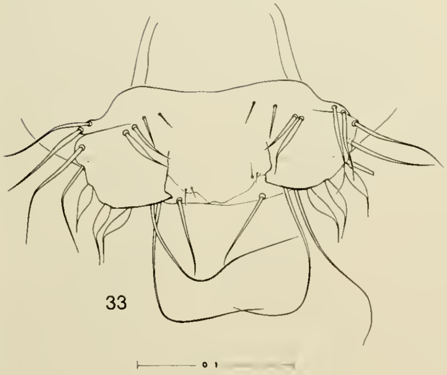

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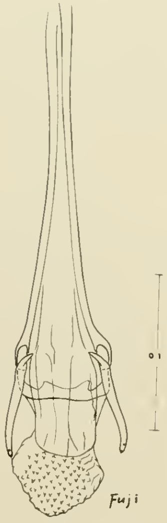

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and Rio Mavaca, and San Juan Rio Manapiare T. F. Amazonas. It was also taken off 39 specimens of *Echimys semivillosus* (I. Geoffroy) collected near El Tocuyo, Lara.

Comments. One host had 22 specimens, two other hosts had 18, but the majority had fewer than 10. No significant difference was found between the populations found on the two host species.

Gliricola mirandai Werneck
(Fig. 35-38)

Gliricola mirandai Werneck, 1935b:417, Fig. 1-6.

The holotype was taken off *Isothrix bistriata* Wagner collected at Porto Bicentenario, Rio Manuel Correia, Mato Grosso, Brazil. Werneck (1948) also recorded it from the type-host collected in Bolivia; no specific locality was given.

Venezuelan Records

Three males and three females of *G. mirandai* were taken off a single specimen of *Isothrix bistriata* collected at Boca Mavaca, T. F. **Amazonas.**

Gliricola pintoi Werneck
(Fig. 39-42)

Gliricola pintoi Werneck, 1935a:373, Fig. 1-6.

The holotype was taken off *Proechimys oris* Thomas collected at Abaete, **Pará**, Brazil. It has been taken off *P. guyannensis* (E. Geoffroy) collected in San Joaquin, **Bení**, Bolivia on March 25, 1963. The illustrations are of specimens from that collection. This species probably occurs in Venezuela but has not been reported there.

Gliricola venezuelanus, new species
(Fig. 43-46)

Holotype male. External morphology and chaetotaxy as in Fig. 44. Head width 0.19 mm. Pleurite VIII with one very long seta; terminal segment without longer posterior setae. Total length 1.16 mm. Genitalia (Fig. 46) 0.09 mm wide and 0.35 mm long; prominent blunt parameres each with three long distal setae, the most posterior one distinctly longer than the others; sac with single elongate median sclerite tapered to sharp point posteriorly.

Allotype female. External morphology and chaetotaxy as in Fig. 43. Head width 0.20 mm. Abdominal tergite III (second apparent tergite) with markedly convex posterior margin. Pleurite VIII with single very long seta; last tergite with one very long seta each side. Ventral terminalia as in Fig. 45, with spatulate and slender setae distributed as shown. Total length 1.31 mm.

Discussion. The third (second apparent) abdominal tergite of the female is unique, thereby separating this species from all other known species of *Gliricola*. The structure and chaetotaxy of the male genitalia parameres and the shape of the genital sac sclerite are also distinctive.

Type-material. Holotype male, allotype female, and paratypes off *Proechimys guyannensis* (E. Geoffroy) collected April 7, 1967, at Hato San José, **Bolívar**, Venezuela.

Venezuelan Records

In addition to the holotype and allotype, paratypes were collected off *Proechimys guyannensis* (E. Geoffroy) at Río Supamo, Hato San José, near Icabarú, and Hato La Forida, **Bolívar**; Belén, Boca Mavaca, Río Mavaca, Tamatama, Capibara, near Puerto Ayaencho, and San Juan Río Manapiare, T. F. **Amazonas**. Paratypes were collected off *Proechimys semispinosus* Tomes at Capibara and Tamatama, T. F. **Amazonas**; Cumaná and Manacal, **Sucre**; Montalbán, **Carabobo**; Altamira, **Barinas**; and Nulita, **Apure**. Paratypes were collected off *Proechimys canicollis* J. A. Allen, 35 km NW La Paz, **Zulia.**

Gliricola echimydis Werneck
(Fig. 47-50)

Gliricola echimydis Werneck, 1933:344, Fig. 1-8.

The holotype was taken off *Echimys cayennensis* Desmarest (= *Proechimys iheringi* Thomas?) collected at Angra dos Reis, **Rio de Janeiro**, Brazil. Werneck (1948) also recorded it off *Proechimys albispinus* (I. Geoffroy) (= *Proechimys iheringi*) collected at Corcovado, **Rio de Janeiro**, Brazil; and *P. dimidiatus* Günther at Angra dos Reis, **Rio de Janeiro**, Brazil. This species is probably also found in Venezuela, but it has not been reported there. The illustrations are of specimens taken off *P. guyannensis* (E. Geoffroy) collected at A. de Guarayos, **Bení**, Bolivia, on June 8, 1964.

Gliricola wenzeli, new species
(Fig. 51-54)

Holotype male. External morphology and chaetotaxy as shown in Fig. 52. Head width 0.21 mm. Pleurite II with single long seta; pleurite VIII with two long setae. Last segment posteriorly with one medium seta on each side, these being shorter than length of last tergite. Total length 1.20 mm. Genitalia (Fig. 54) 0.12

Fig. 35-38. *Gliricola mirandai* Werneck, from *Isothrix bistriata*, T. F. Amazonas: 35, dorsal-ventral view of female; 36, dorsal-ventral view of male; 37, ventral view of female terminalia; 38, male genitalia.

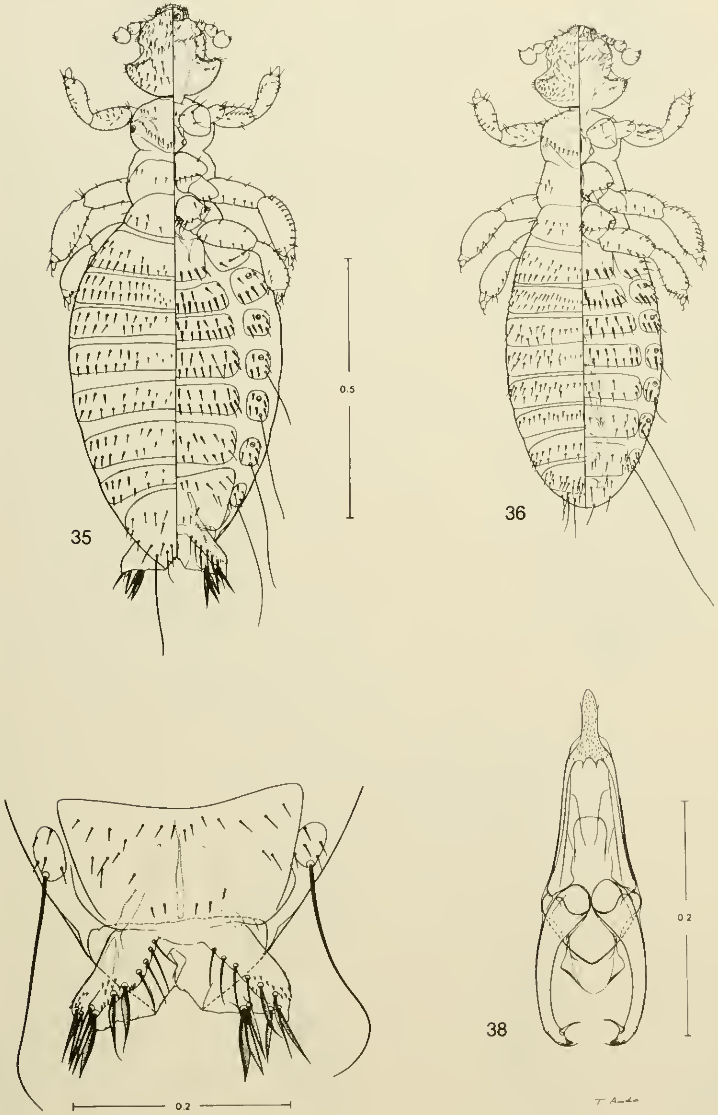


Fig. 39-42. *Gliricola pintoi* Werneck, from *Procchimys guyannensis*, Bení, Bolivia: 39, dorsal-ventral view of female; 40, dorsal-ventral view of male; 41, ventral view of female terminalia; 42, male genitalia.

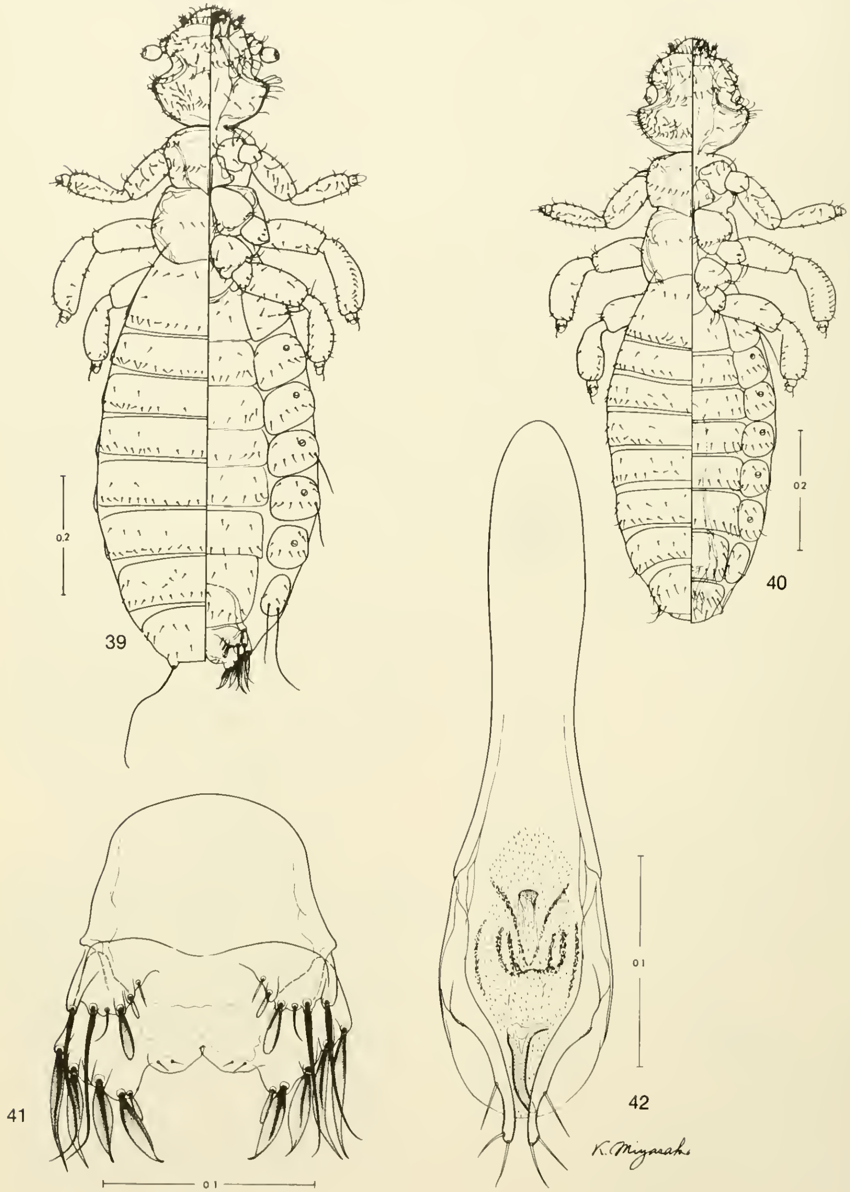


Fig. 43-46. *Gliricola venezuelanus*, new species, from *Proechimys guyannensis*, Bolívar: 43, dorsal-ventral view of female; 44, dorsal-ventral view of male; 45, ventral view of female terminalia; 46, male genitalia.

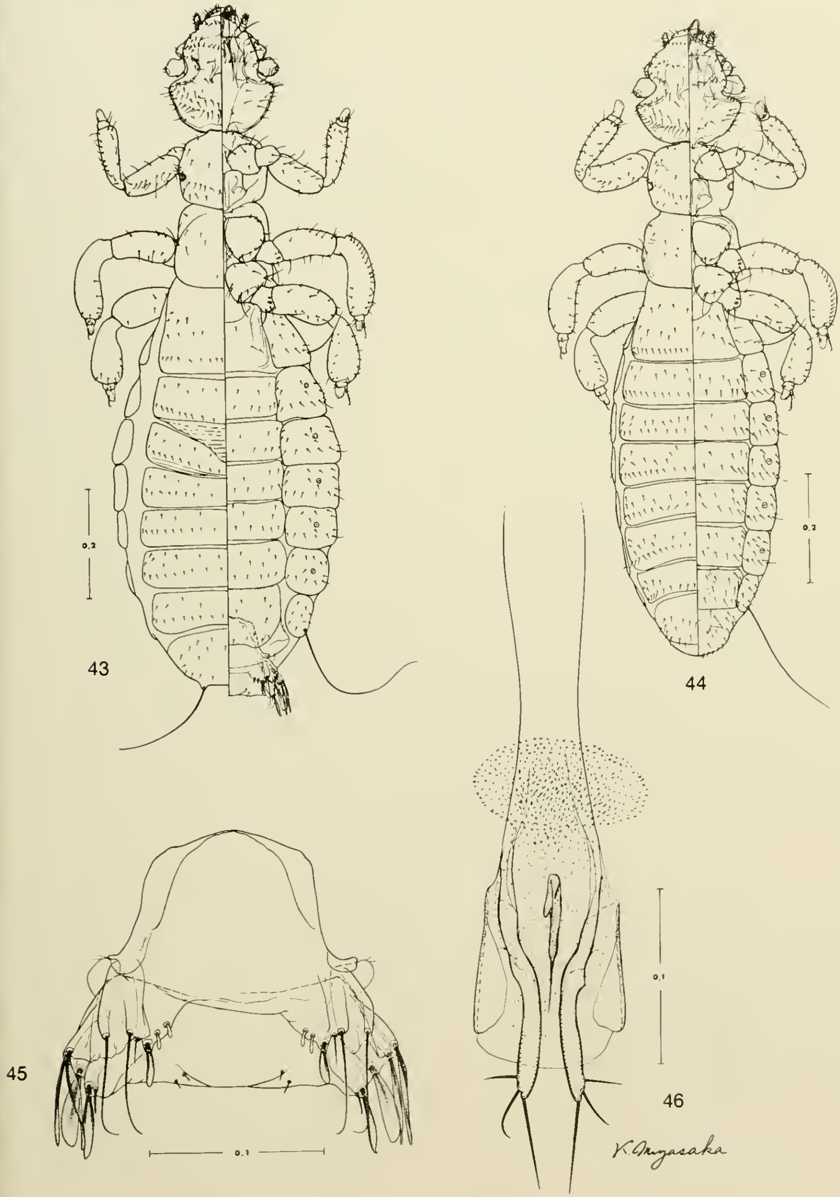
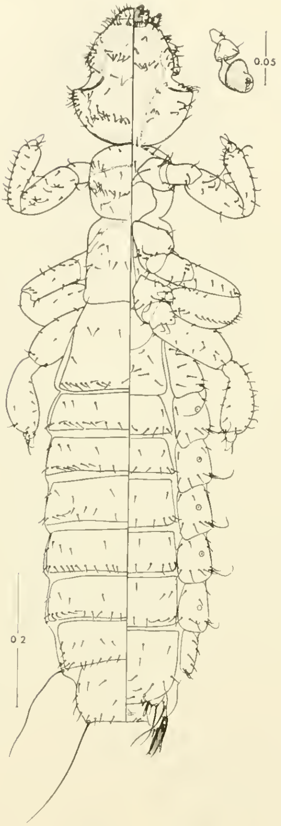


Fig. 47-50. *Gliricola echimydis* Werneck, from *Procchimys guyannensis*, Beni, Bolivia: 47, dorsal-ventral view of female; 48, dorsal-ventral view of male; 49, ventral view of female terminalia; 50, male genitalia.



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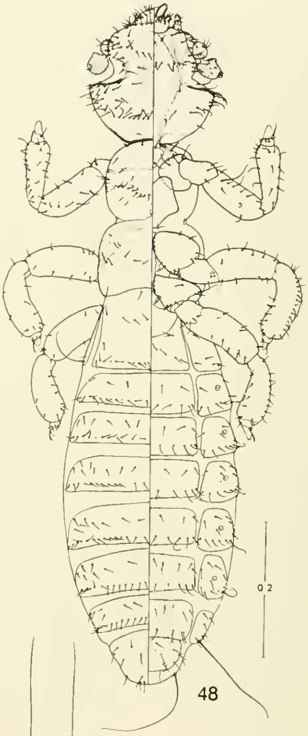

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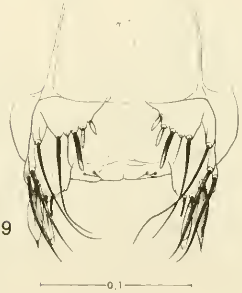

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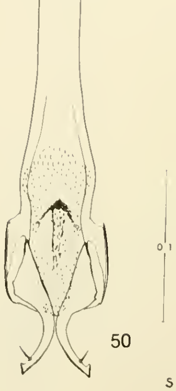

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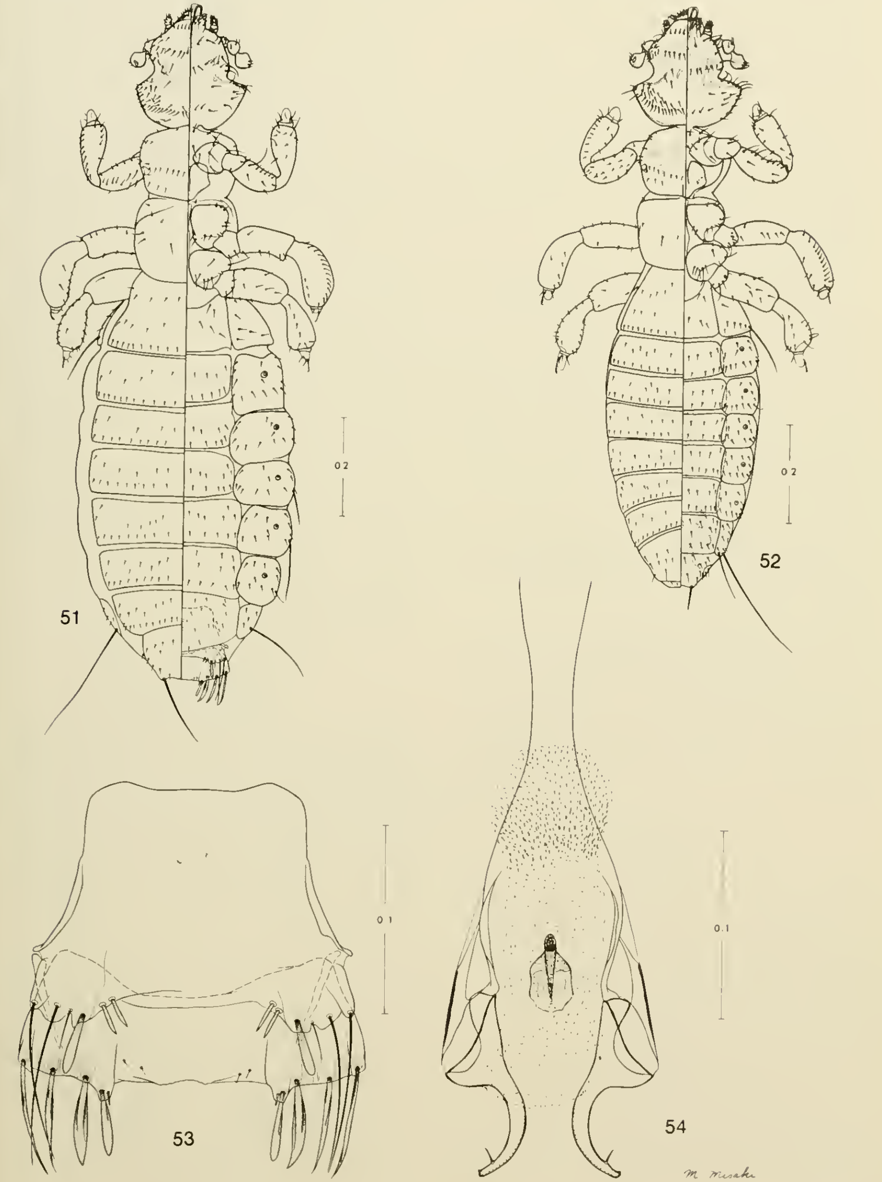
Fig. 51-54. *Gliricola wenzeli*, new species, from *Proechimys semispinosus*, Sucre: 51, dorsal-ventral view of female; 52, dorsal-ventral view of male; 53, ventral view of female terminalia; 54, male genitalia.



mm wide and 0.31 mm long; parameres outwardly curved, each with single subapical seta and with indistinct suggestion of terminal barb; median sclerite of genital sac as shown.

Allotype female. External morphology and chaetotaxy as shown in Fig. 51. Head width 0.23 mm. Pleurite II with single long seta; setae of pleurites V-VI vary from long (as shown) to all short; pleurite VIII with two long setae. Last segment with long posterior seta on each side, these longer than length of last tergite. Ventral terminalia as in Fig. 53, with distribution of spatulate and slender setae as shown. Total length 1.43 mm.

Discussion. This species is closely related to *G. echimydis* and *G. vogelsangi* Werneck. *G. wenzeli* is larger than either of them in all aspects. The terminal abdominal segment of the female of *G. wenzeli* is rounded, while it is almost square shaped in *G. echimydis* and *G. vogelsangi*. The barbing of the paramere tip and the shape of the genital sac sclerite also help to separate *G. wenzeli* males. The innermost seta of the posterior terminalia row is much longer for the female *G. vogelsangi* than for *G. wenzeli*.

Type-material. Holotype male, allotype female, and paratypes off *Proechimys semispinosus* Tomes collected July 19, 1967, at Manacal, Sucre, Venezuela.

VENEZUELAN RECORDS

In addition to the holotype and allotype, paratypes were collected off 17 specimens of the type-host at Manacal, Sucre; and Cueva del Guácharo, La Laguna, and San Agustín, Monagas.

Comment. Infestations varied from 62 males, 113 females, and 99 immatures on one host to one male and one female on another.

Gliricola vogelsangi Werneck
(Fig. 55-58)

Gliricola vogelsangi Werneck, 1951:303, Fig. 1-5.

The holotype was taken off *Proechimys trinitatis* Allen and Chapman (= *P. semispinosus* Tomes) collected at Caripito, Monagas, Venezuela. There have been no published records since the original description.

Gliricola handleyi, new species
(Fig. 59-62)

Holotype male. External morphology and chaetotaxy as shown in Fig. 60. Head width 0.21 mm. Pleurite VIII with one very long seta; last segment with only minute setae. Total length 1.20 mm. Genitalia (Fig. 62) 0.12 mm wide and 0.31 mm long; parameres irregularly enlarged distally, each directed somewhat laterad, and each with indistinct short terminal setae; genital sac with small elongate median sclerite.

Allotype female. External morphology and chaetotaxy as shown in Fig. 59. Head width 0.23 mm. Pleurites IV-VII each with long, heavy seta; pleurite VIII with one very long seta. Last tergite with one long seta on each side. Ventral terminalia as in Fig. 61, with spatulate setae restricted to posteriormost row, and relative setal lengths as shown. Total length 1.23 mm.

Discussion. This series is closest to *G. vogelsangi*, *G. wenzeli*, and *G. echimydis* in general appearance. The male of *G. handleyi* is, however, separable from them by its distinctively different genitalic structure and the absence of any long setae on the terminal segment. The female of *G. handleyi* differs from the others by the absence of spatulate setae in the anteriormost ventral terminalia row and by the distribution of long pleural setae.

Type-material. Holotype male, allotype female, and 32 paratypes off three specimens of *Proechimys hoplomyoides* Tate collected May 9, 1966, at 125 km, 85 km SSE of El Dorado, Bolívar, Venezuela.

VENEZUELAN RECORDS

Type-material only.

Gliricola tiptoni, new species
(Fig. 63-66)

Holotype male. External morphology and chaetotaxy as shown in Fig. 64. Head width 0.22 mm. Pleurite II with one long seta; pleurite VIII with two long setae; terminal segment with one medium seta on each side, these being shorter than length of last tergite. Total length 1.38 mm. Genitalia (Fig. 66) 0.12 mm wide and 0.47 mm long; parameres directed laterad, each with distinct apical barb and one subapical seta; genital sac with single elongate, pointed, median sclerite.

Allotype female. External morphology and chaetotaxy as shown in Fig. 63. Head width 0.22 mm. Pleurite II with one long seta; pleurite VIII with two very long setae; last tergite with one very long seta on each side. Ventral terminalia as in Fig. 65, with distribution and lengths of spatulate and slender setae as shown. Total length 1.43 mm.

Discussion. This species is probably closest to those in the *G. decurtatus* complex. However, it is easily separated from them by its large size,

Fig. 55-58. *Gliricola vogelsangi* Werneck, from *Proechimys trinitatis*. From Werneck, 1951: 55, dorsal-ventral view of female; 56, dorsal-ventral view of male; 57, ventral view of female terminalia; 58, male genitalia.

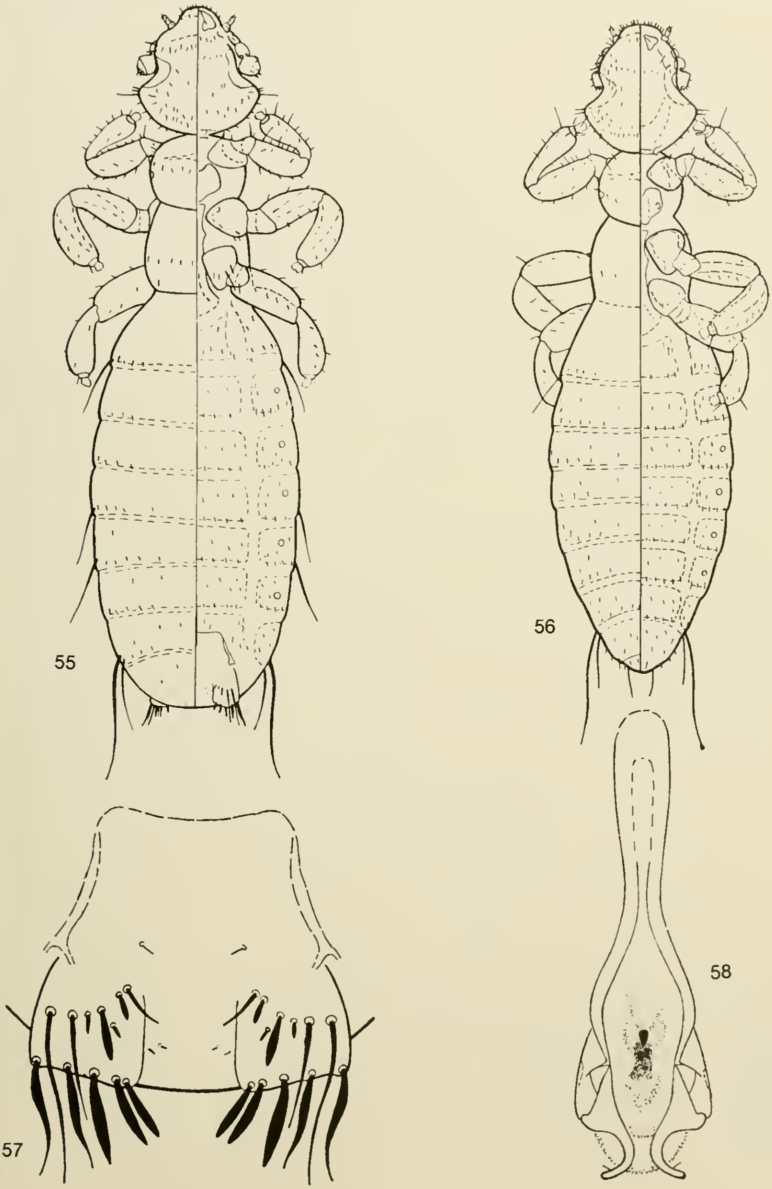


Fig. 59-62. *Gliricola handleyi*, new species, from *Proechimys hoplomyoides*, Bolívar: 59, dorsal-ventral view of female; 60, dorsal-ventral view of male; 61, ventral view of female terminalia; 62, male genitalia.

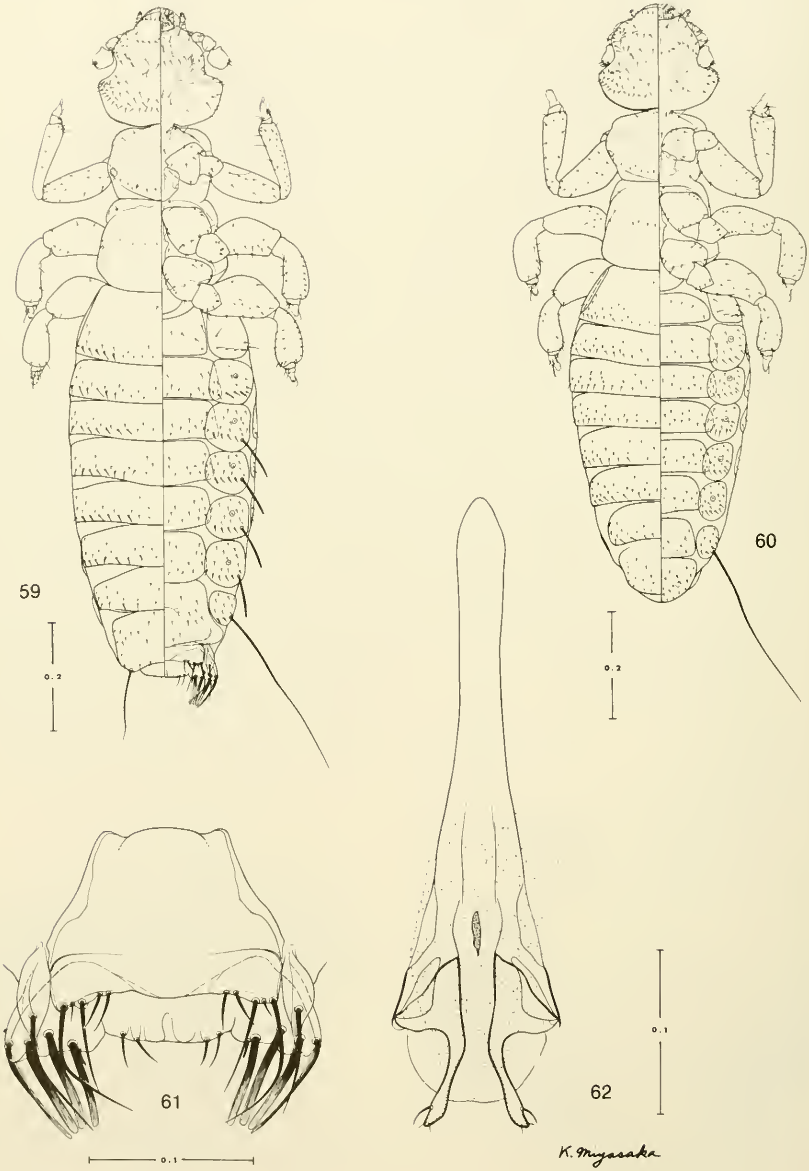


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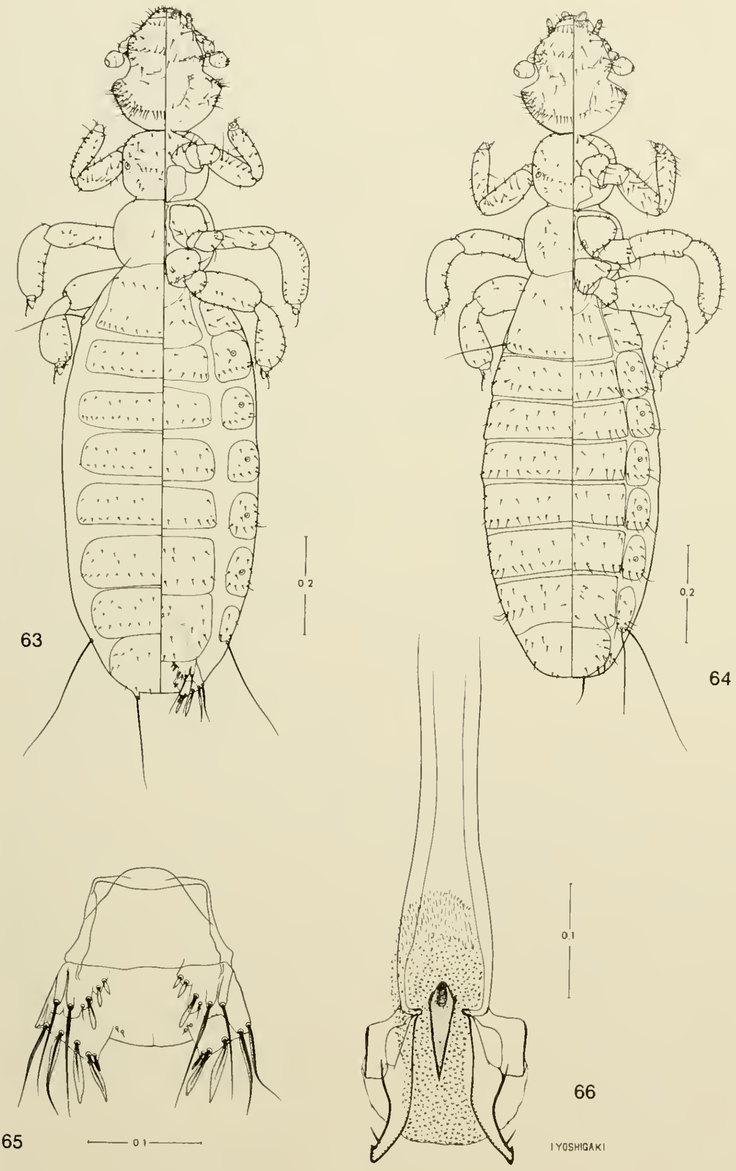
Fig. 63-66. *Gliricola tiptoni,* new species, from *Procchimys semispinosus,* Trujillo: 63, dorsal-ventral view of female; 64, dorsal-ventral view of male; 65, ventral view of female terminalia; 66, male genitalia.



by the male having quite different genitalic structure and chaetotaxy of the last segment, and by the female having different setal lengths and types associated with its terminalia. Apparently some females are inseparable from those of *G. wenzeli*, but the male of *G. tiptoni* is larger and has much larger and different genitalia.

Type-material. Holotype male and allotype female off *Proechimys semispinosus* Tomes collected September 13, 1965, at El Dividive, **Trujillo**, Venezuela.

Venezuelan Records

In addition to the holotype and allotype, paratypes were collected off *Proechimys semispinosus* Tomes taken at El Rosario and Kasmera, **Zulia;** Isnoto, El Dividive, Sta. Apolonia, and Agua Santa, **Trujillo;** Altamira, **Barinas;** Montalbán, **Carabobo;** Nulita, **Apure;** Cumaná and Manacal, **Sucre;** Urama and Minas de Aroa, **Yaracuy;** Caserio Boro, near El Tocuyo, **Lara;** Cerro Socopo, Río Socopito, near Mirimiri, and Cerro Santa Ana, **Falcón;** Curapao, **Miranda;** Hato las Palmitas, **Guárico;** Tamatama and Capibara, T. F. **Amazonas.**

Paratypes were collected off *Proechimys guyannensis* (E. Geoffroy) taken at Puerto Ayacucho and San Juan Río Manapiare, T. F. **Amazonas;** and near Icabarú, **Bolívar.**

Paratypes were collected off *Proechimys canicollis* J. A. Allen taken 35 km NW La Paz, **Zulia.**

Comment. This parasite was taken off 252 specimens of *Proechimys*, most of which were *P. semispinosus.*

Gliricola mendezi, new species

(Fig. 67-70)

Holotype male. External morphology and chaetotaxy as shown in Fig. 68. Head width 0.20 mm. Pleurites II-VII each with one longer seta; pleurite VIII with one very long seta; last segment with one somewhat longer seta on each side, these being much shorter than length of last tergite. Total length 1.10 mm. Genitalia (Fig. 70) 0.07 mm wide and 0.30 mm long; parameres slender, fairly straight, flexed laterally only near tip, and each with distinct apical barb and subapical seta; single median sclerite associated with genital sac.

Allotype female. External morphology and chaetotaxy as shown in Fig. 67. Head width 0.18 mm. Pleurites II-VIII with longer setae as in male; last segment with one very long seta on each side. Ventral terminalia as in Fig. 69, with lengths and distribution of spatulate and slender setae as shown. Total length 1.31 mm.

Discussion. This species does not appear to be closely related to any known species. The male is distinguished by its genitalia, especially the shape of the parameres and genital sac sclerite, by the distribution of longer setae on the pleurites and terminalia, and by its dimensions. The female is recognizable by its dimensions, the number of longer pleural and terminal setae, and the ventral terminalia chaetotaxy.

Type-material. Holotype male and allotype female off *Proechimys semispinosus* Tomes collected May 21, 1967, at Tamatama, T. F. **Amazonas,** Venezuela.

Venezuelan Records

In addition to the holotype and allotype, paratypes were collected off type-host taken at Río Mavaca, Tamatama, and Capibara, T. F. **Amazonas.**

Genus *Gyropus* Nitzsch

Gyropus Nitzsch, 1818:303.
Haemabrus Nitzsch, 1874:6.
Diplocerus Nitzsch, 1874:6.
Monogyropus Ewing, 1924:10.
Allogyropus Ewing, 1924:20.
Tetragyropus Ewing, 1924:21.
Eogyropus Eichler, 1952:76.

Type-species: *Gyropus ovalis* Burmeister, 1838, by subsequent designation.

Gyropus ovalis Burmeister

(Fig. 71-74)

Gyropus ovalis Burmeister, 1838:443.

Gyropus turbinatum Piaget, 1880:609, Pl. 50, Fig. 7.

Macrogyropus mexicanus Zavaleta, 1946:438, Fig. 2, and G-L.

The holotype was taken off a domestic guinea pig, *Cavia porcellus* Linnaeus. It is now found worldwide on that host. Werneck (1948) recorded it off wild *C. porcellus* collected in **Distrito Federal, Rio de Janeiro, São Paulo,** and **Mato Grosso,** Brazil; *C. aperea* Erxleben collected in **São Paulo** and **Mato Grosso,** Brazil, and Villarica, Paraguay; *C. pamparum* Thomas collected in **Chaco,** Argentina; *C. tschudii pallidior* Thomas collected in **Arequipa,** Peru; *C. rufescens* Lund collected in **São Paulo,** Brazil; and *C. fulgida* Wagler collected in **Espírito Santo,** Brazil.

Venezuelan Records

Gyropus ovalis was taken off 6 specimens of *Cavia porcellus* collected at San Agustín, Monagas; and Montalbán, **Carabobo.**

Fig. 67-70. *Gliricola mendezi*, new species, from *Proechimys semispinosus*, T. F. Amazonas: 67, dorsal-ventral view of female; 68, dorsal-ventral view of male; 69, ventral view of female terminalia; 70, male genitalia.

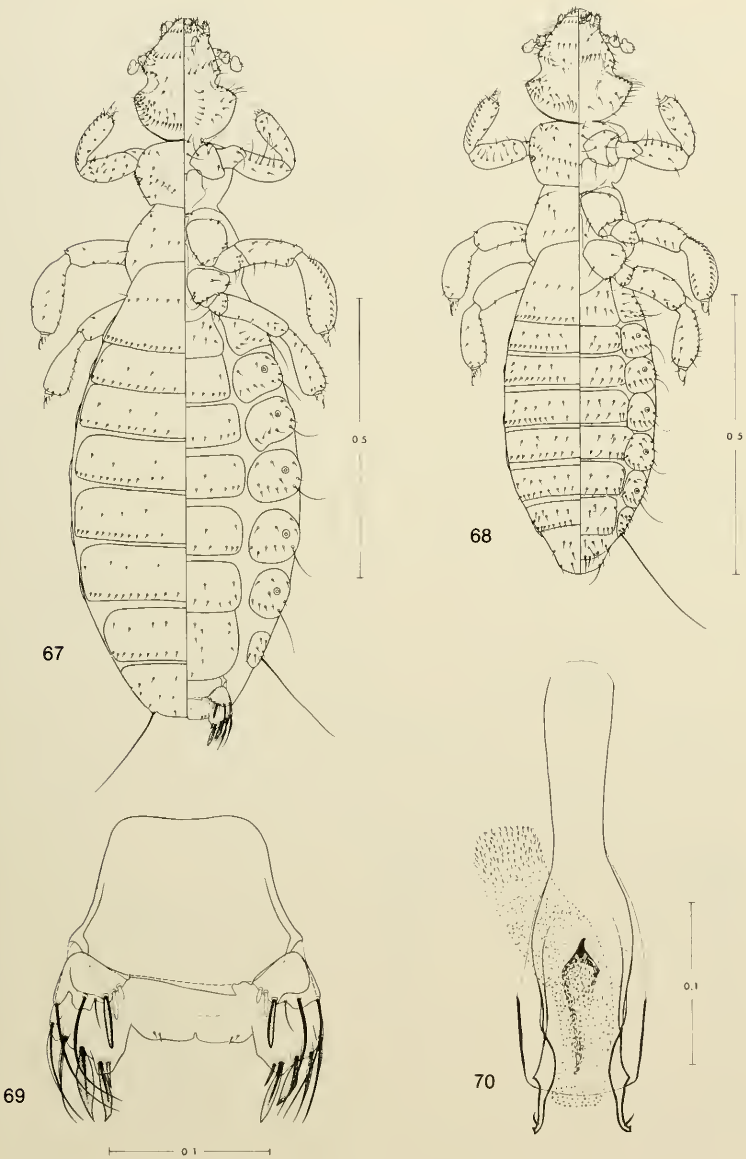
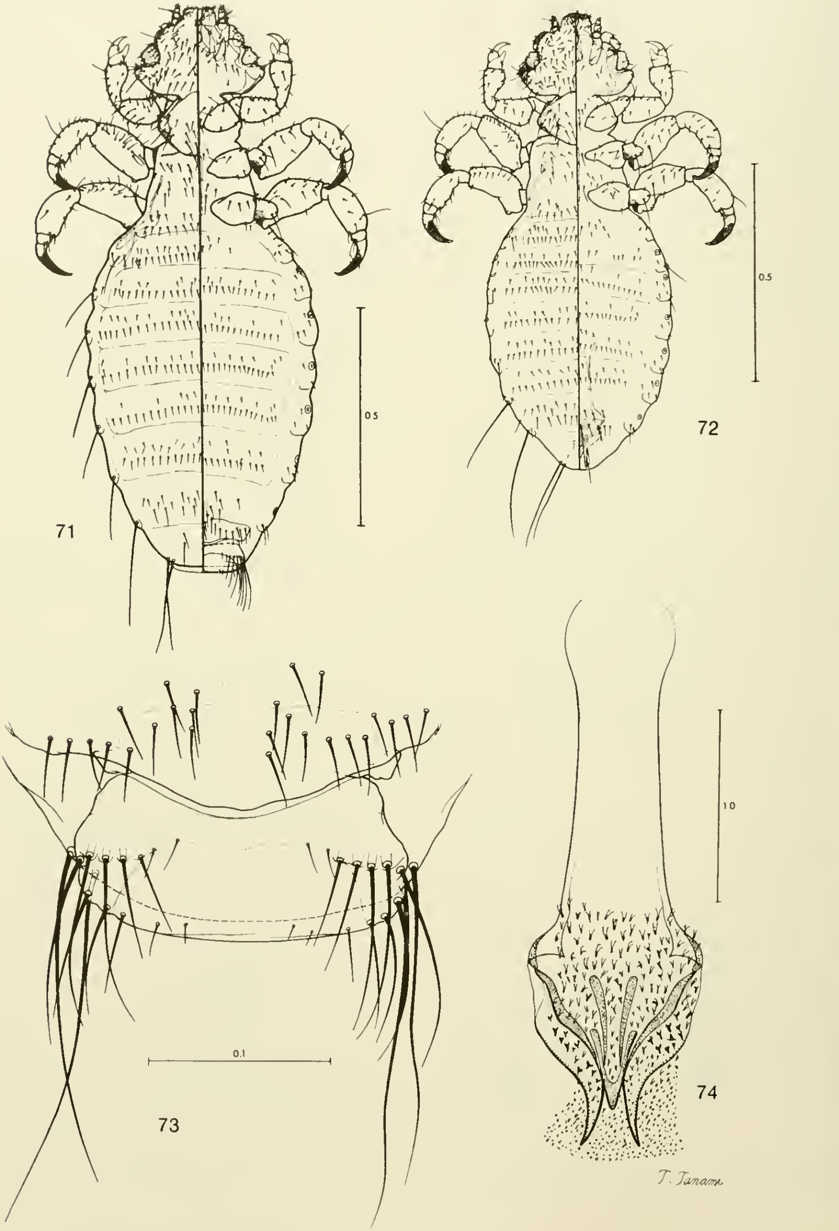


Fig. 71-74. *Gyropus ovalis* Burmeister, from *Cavia porcellus*, Monagas: 71. dorsal-ventral view of female; **72,** dorsal-ventral view of male; 73, ventral view of female terminalia; 74, male genitalia.



Comments. One host had 13 specimens, another had 9, and the remainder had only 1 or 2.

Gyropus wernecki, new species
(Fig. 75-78)

Holotype male. External morphology and chaetotaxy as shown in Fig. 76. Head width 0.28 mm; each side with one very long marginal temple seta and one longer dorsal seta. Tergites with only single row of setae, those lateral shorter than those medial. All pleurites with one very long seta. Sternites with setal lengths much as for tergites. Total length 1.25 mm. Genitalia (Fig. 78) 0.14 mm wide and 0.38 mm long; parameres long, slender, abruptly flexed to one side, and without setae.

Allotype female. External morphology and chaetotaxy as shown in Fig. 75; much as for male except for terminalia. Head width 0.30 mm. Ventral terminalia as in Fig. 77. Total length 1.43 mm.

Discussion. This species is closest to *G. emersoni* Mendez, collected off *Proechimys semispinosus panamensis* Thomas in Panama, and *G. mesoamericanus* Mendez off *Hoplomys gymnurus truei* J. A. Allen in Panama. The male of *G. wernecki* differs from that of *G. mesoamericanus* in having differently shaped parameres of the genitalia and a differently structured genital sac. It differs from that of *G. emersoni* in having longer and more slender parameres of the genitalia. While the lateroposterior chaetotaxy of the female of the three species is similar, *G. wernecki* differs from the other two in the median chaetotaxy. The parameres of *G. parasetosus* Werneck, found on *Proechimys spinosus* Desmarest (=*Proechimys setosus* Desmarest?) in Brazil, are much longer than those of *G. wernecki;* the parameres of *G. setosus* Neumann, found on *P. securus* Thomas in Bolivia, are approximately the same length as those of *G. wernecki,* but they are of a different shape and the genital sac contains more complex structures.

Type-material. Holotype male and allotype female off *Proechimys semispinosus* Tomes collected November 7, 1965, at Sta. Apolonia, Trujillo, Venezuela.

Venezuelan Records

In addition to the holotype and allotype, paratypes were collected off the type-host taken at Manacal, Sucre; La Pastora, Cerro Socopo, Río Socopito, and Cerro Santa Ana, Falcón; Kasmer, and El Rosario, Zulia; Montalbán, Carabobo; Urama, Yaracuy and Carabobo; Nulita, Apure; Altamira, Barinas; Caserio Boro, near El Tocuyo, Lara; Agua Santa, Isnoto, El Dividive, and Sta. Apolonia, Trujillo; San Agustín and Cueva del Guácharo, Monagas; Tamatama and Río Mavaca, T. F. Amazonas; and Minas de Aroa, Yaracuy.

Paratypes were collected off *Proechimys guyannensis* (E. Geoffroy) taken at Puerto Ayacucho, Belén, Boca Mavaca, Río Mavaca, and Capibara, T. F. Amazonas; and El Manaco, Bolívar.

Paratypes were collected off *Proechimys canicollis* J. A. Allen, taken 35 km NW La Paz, Zulia.

Comments. Specimens were taken off 269 individual hosts, most of which also had *Gliricola tiptoni.* One host had 13 males, 16 females, and 64 immature specimens; another had 21 males, 21 females, and 46 immatures; but most had fewer than 20.

Gyropus thompsoni Werneck
(Fig. 79-82)

Gyropus thompsoni Werneck, 1935b:421, Fig. 7-13.

The holotype was taken off *Isothrix bistriata* Wagner collected near Porto Bicentenario, Rio Maneol Correia, Mato Grosso, Brazil. There have been no published records since the original description.

Venezuelan Records

Gyropus thompsoni was taken off four specimens of *Isothrix bistriata* collected at Boca Mavaca, T. F. Amazonas.

Comments. One host had 39 specimens, one had 22, one 12, and one had only a single specimen.

Genus *Macrogyropus* Ewing

Macrogyropus Ewing, 1924:25.

Heterogyropus Ewing, 1924:27.

Type-species: *Macrogyropus dentatus* Ewing, 1924.

Macrogyropus dicotylis (Macalister)
(Fig. 83-86)

Gyropus dicotylis Macalister, 1869:420, Fig'd.

Macrogyropus dentatus Ewing, 1924:26, Pl. 1, Fig. 5.

The holotype was collected off *Dicotyles torquatus* Goeldi and Hagmann (=*Tayassu tajacu* [Linnaeus]). Werneck (1948) recorded the species off the type-host collected in Pará, Espirito Santo, Rio de Janeiro, Minas Gerais, São

Fig. 75-78. *Gyropus wernecki*, new species, from *Proechimys semispinosus*, Trujillo: 75, dorsal-ventral view of female; 76, dorsal-ventral view of male; 77, ventral view of female terminalia; 78, male genitalia.

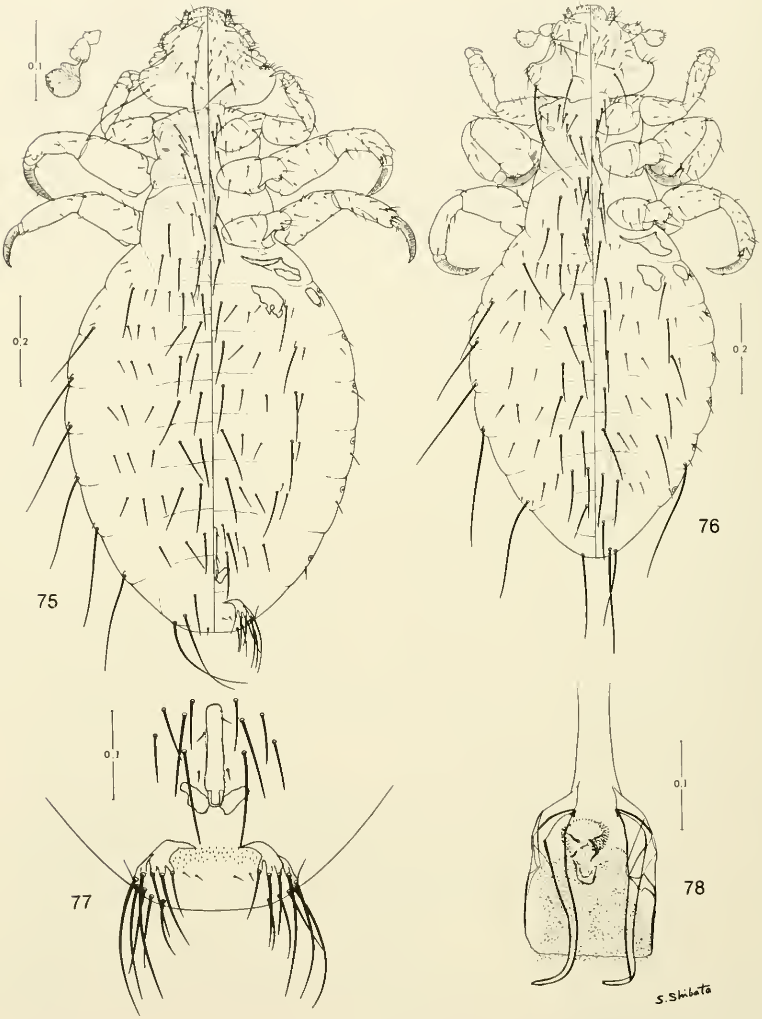


Fig. 79-82. *Gyropus thompsoni* Werneck, from *Isothrix bistriata,* T. F. Amazonas: 79, dorsal-ventral view of female; 80, dorsal-ventral view of male; 81, ventral view of female terminalia; 82, male genitalia.

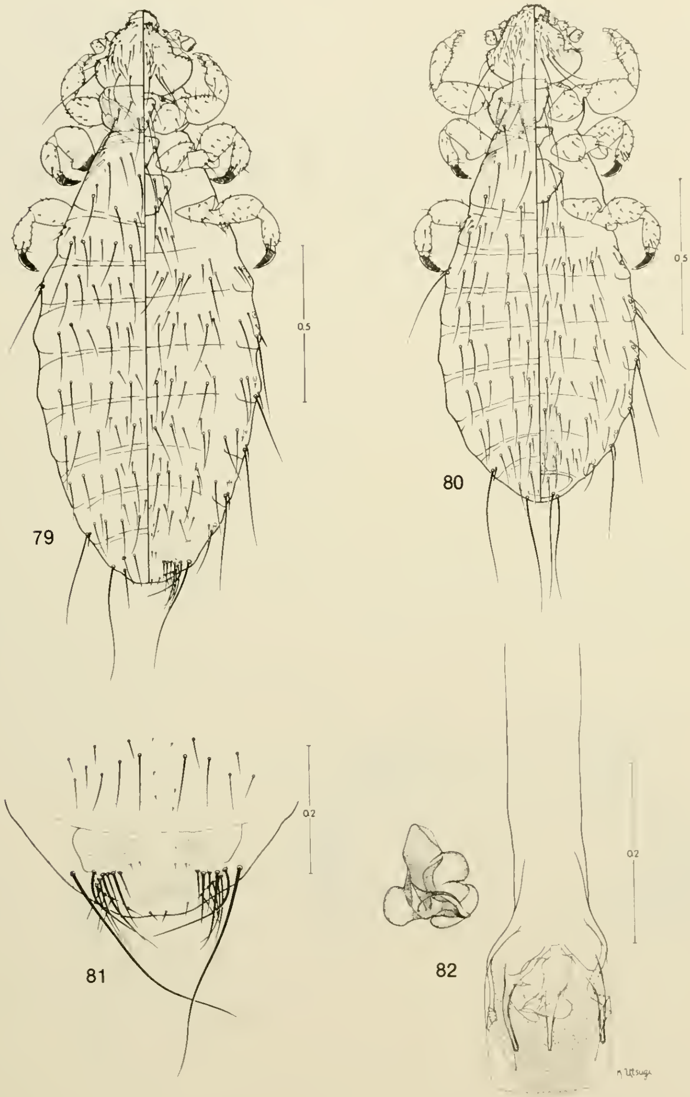
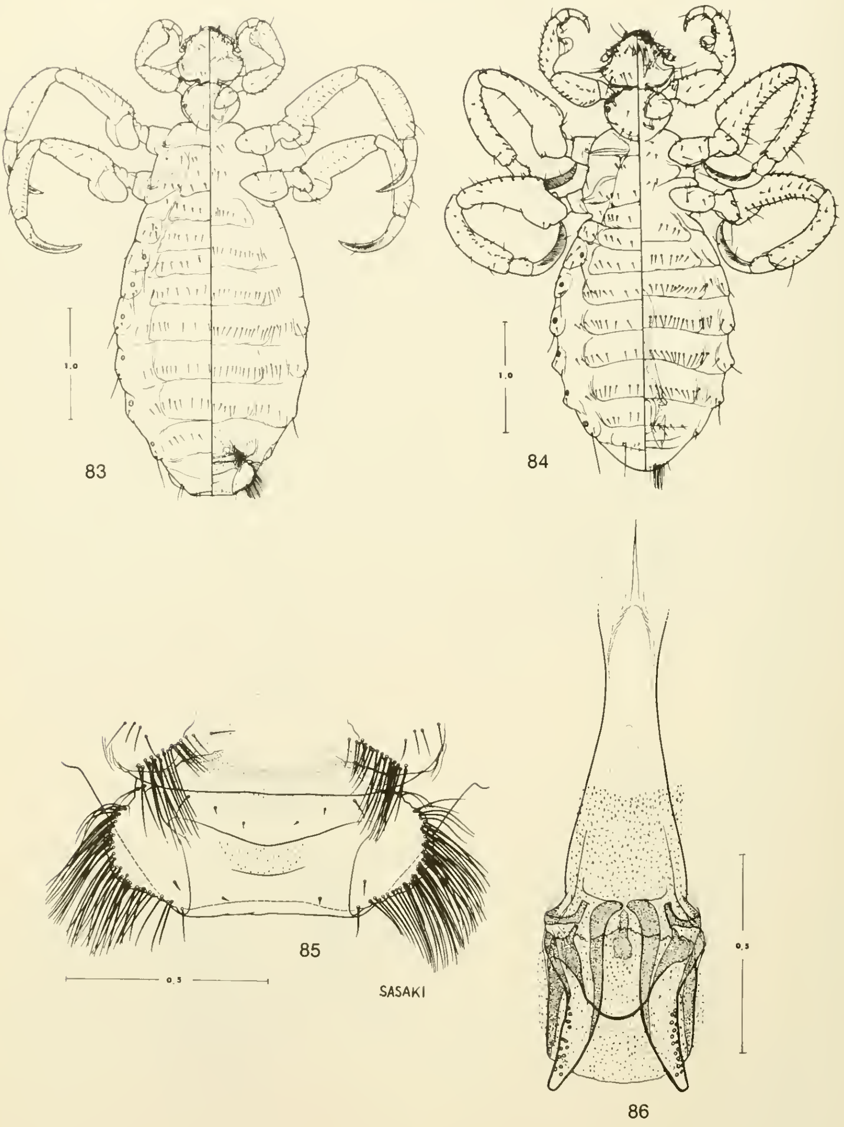


Fig. 83-86. *Macrogyropus dicotylis* (Macalister), from *Tayassu pecari*, Bolívar: 83, dorsal-ventral view of female; 84, dorsal-ventral view of male; 85, ventral view of female terminalia; 86, male genitalia.



Paulo, and **Santa Catarina**, Brazil; Costa Rica; Nicaragua; Guyana; and Argentina. Emerson (1966) recorded it off the type-host collected in Panamá. Werneck (1948) recorded the species off *Tayassu albirostris* Illiger (=*Tayassu pecari* [G. Fischer]) collected in **Rio de Janeiro** and **Pará**, Brazil.

Venezuelan Records

M. dicotylis was taken off *Tayassu tajacu* (Linnaeus) at Nulita, **Apure**; Altamira, **Barinas**; Río Supamo, **Bolívar**; and near Mirimiri, **Falcón**. It was taken off *Tayassu pecari* (G. Fisscher) collected at Río Supamo, and near Icabarú, **Bolívar**.

Macrogyropus amplexans amplexans (Neumann)

(Fig. 87-90)

Gyropus amplexans Neumann, 1912a:224, Fig. 11-13.

The holotype was taken off *Dasyprocta aguti* (Linnaeus) collected in Brazil, without specific locality. Werneck (1948) recorded it off the type-host collected in **Rio de Janeiro**, **Minas Gerais**, and **Mato Grosso**, Brazil. He also recorded it off *D. azarae* Lichtenstein collected in **Mato Grosso**, Brazil and off *D. variegata* Tschudi collected in Restrepo, Meta, Colombia. Emerson (1971) recorded it off *D. punctata punctata* Gray collected in Nicaragua.

Venezuelan Records

Seven females of *M. amplexans amplexans* were taken. Unfortunately, most data on these specimens are inadequate.

Comments. In the absence of adequate Venezuelan material, illustrations are of male specimens collected in Nicaragua.

Macrogyropus amplexans longisetis Werneck

(Fig. 91-94)

Macrogyropus amplexans longisetis Werneck, 1948:92, Fig. 119-120.

The holotype was taken off *Myoprocta acouchy* Erxleben collected in Macapá, Pará, Brazil. Werneck (1948) also recorded it off the type-host collected at Mel, Rio Cumina, **Pará**, Brazil.

Venezuelan Records

One male and four females were taken off two specimens of *Myoprocta pratti* Pocock collected at Boca Mavaca, T. F. **Amazonas**. One female was taken off the same host species collected at Río Mavaca, T. F. **Amazonas**.

Macrogyropus costalimai (Werneck)

(Fig. 95-98)

Heterogyropus costalimai Werneck, 1931a:21, Fig. 1-3.

The holotype was taken off *Cuniculus paca* (Linnaeus) (=*Agouti paca* Linnaeus) collected in Mun de Itaguai, **Rio de Janeiro**, Brazil. Werneck (1948) recorded it off the type-host collected in **Distrito Federal**, **Rio de Janeiro**, **Espírito Santo**, and **São Paulo**, Brazil; and Guyana.

Venezuelan Records

M. costalimai was taken off three specimens of *A. paca* collected at La Copa, near Montalbán, **Carabobo**; Puerto Ayacucho, T. F. **Amazonas**; and El Rosario, **Zulia**.

Comments. One host had 16 specimens, one had 3 specimens, and one had a single female.

Genus *Aotiella* Eichler

Aotiella Eichler, 1949:11. Type-species: *Gyropus aotophilus* Ewing, 1924.

Aotiella aotophilus (Ewing)

(Fig. 99-102)

Gyropus aotophilus Ewing, 1924:23, Fig. 11.

The holotype was taken off *Aotus boliviensis* Elliott in Bolivia. Werneck (1948) also reported it off *Aotus trivirgatus* (Humboldt) collected in **Pará**, Brazil; and *Aotus infulatus* (Kuhl) collected in **São Paulo**, Brazil.

Venezuelan Records

A. aotophilis was taken off seven specimens of *Aotus trivirgatus* collected at Puerto Ayacucho, Boca Mavaca, and San Juan Río Manapiare, T. F. **Amazonas**.

Comments. One host had 17 specimens, one 13, and the others fewer than 5.

Family Trichodectidae

Genus *Lymeon* Eichler

Lymeon Eichler, 1940:158. Type-species: *Trichodectes gastrodes* Cummings, 1916.

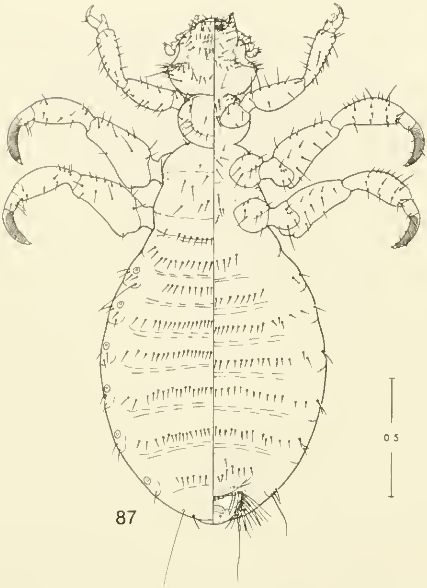
Lymeon gastrodes (Cummings)

(Fig. 103-106)

Trichodectes gastrodes Cummings, 1916:94, Fig. 2-4.

The holotype was collected off *Choloepus didactylus* (Linnaeus) in Río Supinaam, Guyana.

Fig. 87-90. *Macrogyropus amplexans amplexans* (Neumann), from *Dasyprocta aguti*, Carabobo: 87, dorsal-ventral view of female; 88, dorsal-ventral view of male; 89, ventral view of female terminalia; 90, male genitalia.



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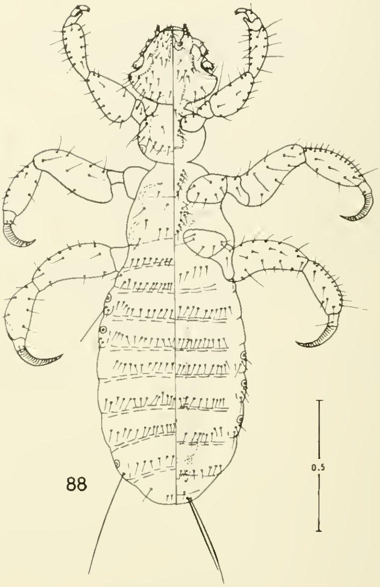

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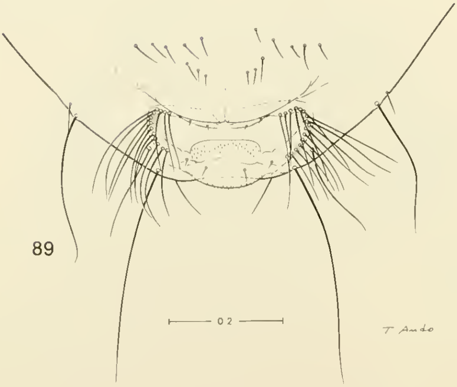

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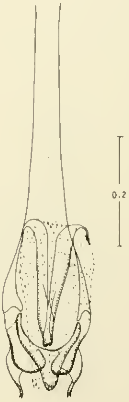

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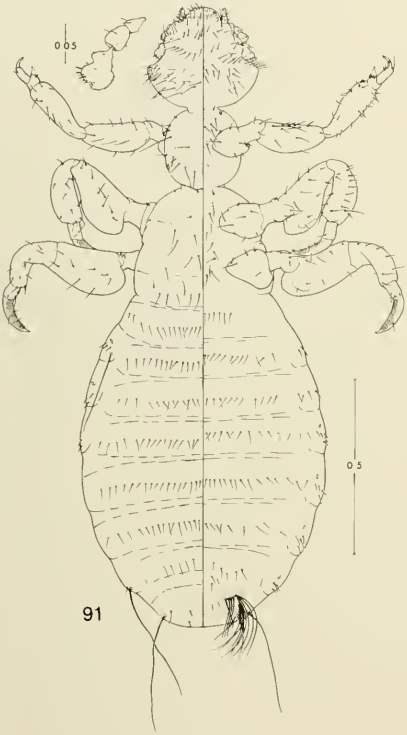
Fig. 91-94. *Macrogyropus amplexans longisetis* Werneck, from *Myoprocta pratti,* T. F. Amazonas: 91, dorsal-ventral view of female; 92, dorsal-ventral view of male; 93, ventral view of female terminalia; 94, male genitalia.



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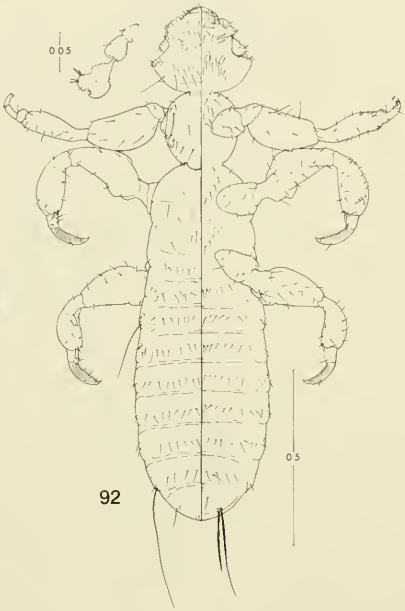

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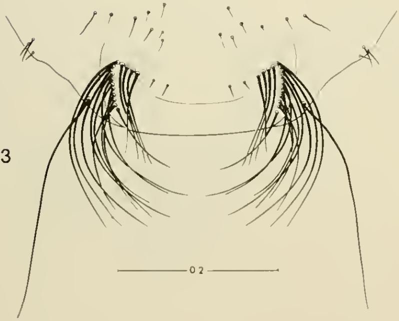

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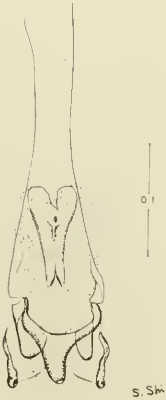

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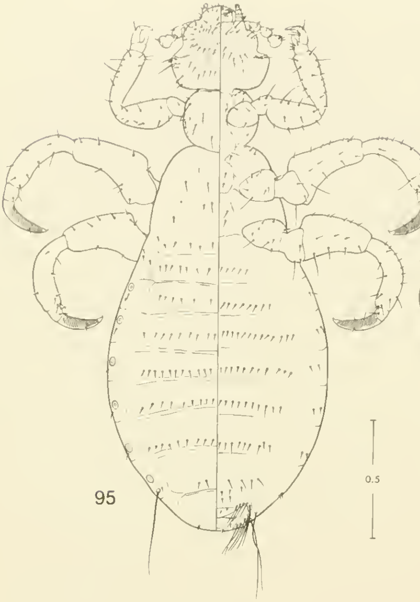
S. Shibata

Fig. 95-98. *Macrogyropus costalimai* (Werneck), from *Agouti paca*, Zulia: 95, dorsal-ventral view of female; 96, dorsal-ventral view of male; 97, ventral view of female terminalia; 98, male genitalia.



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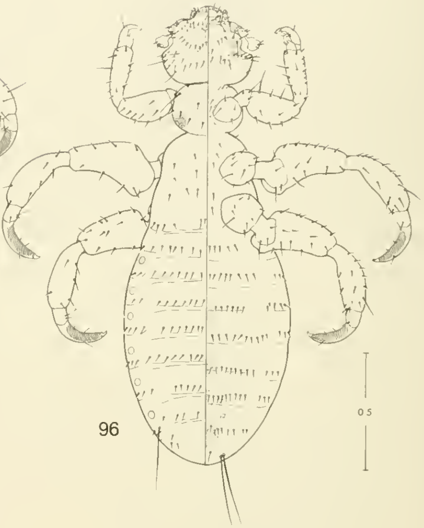

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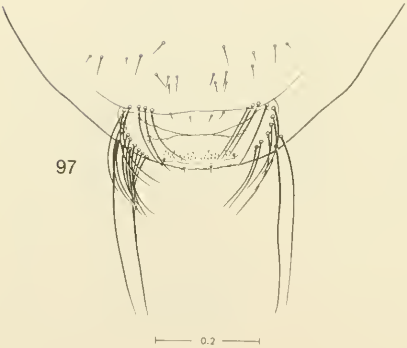

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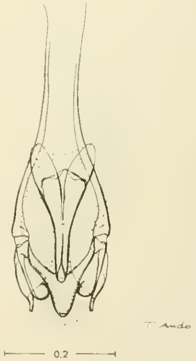

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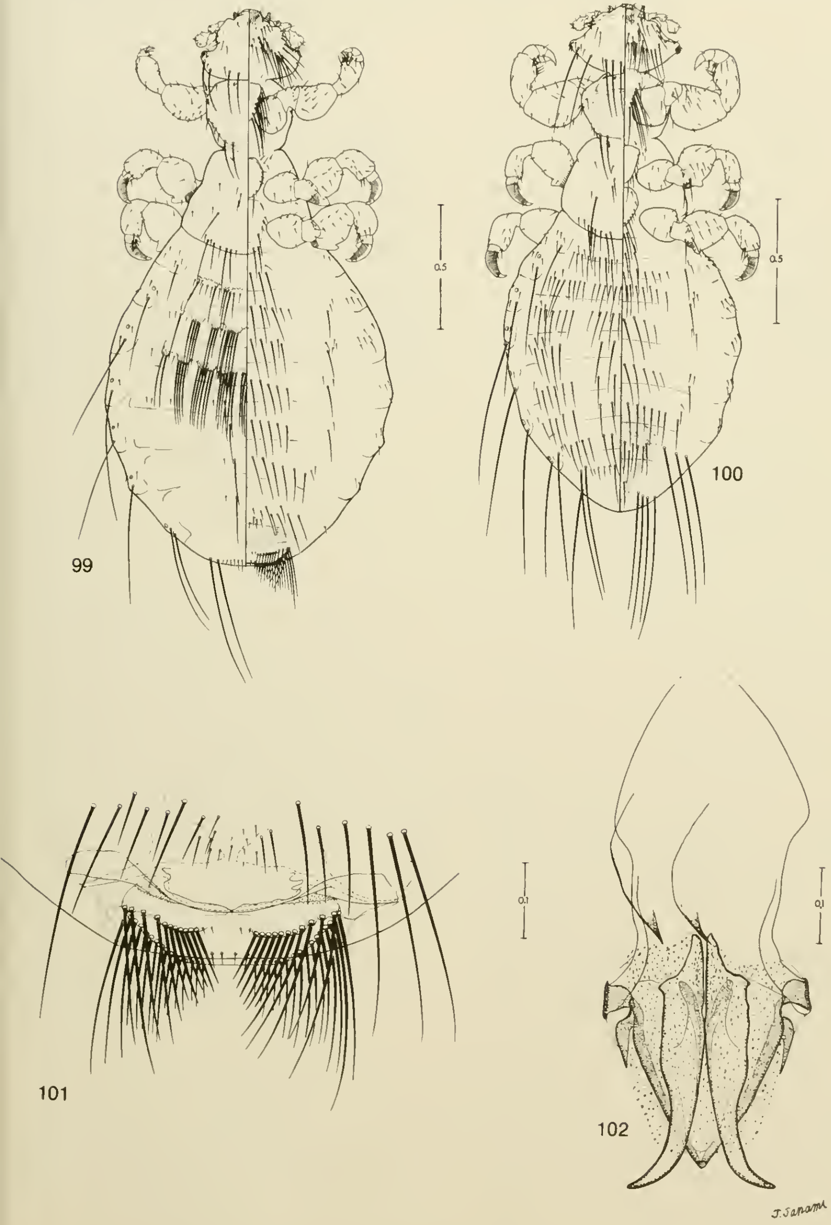
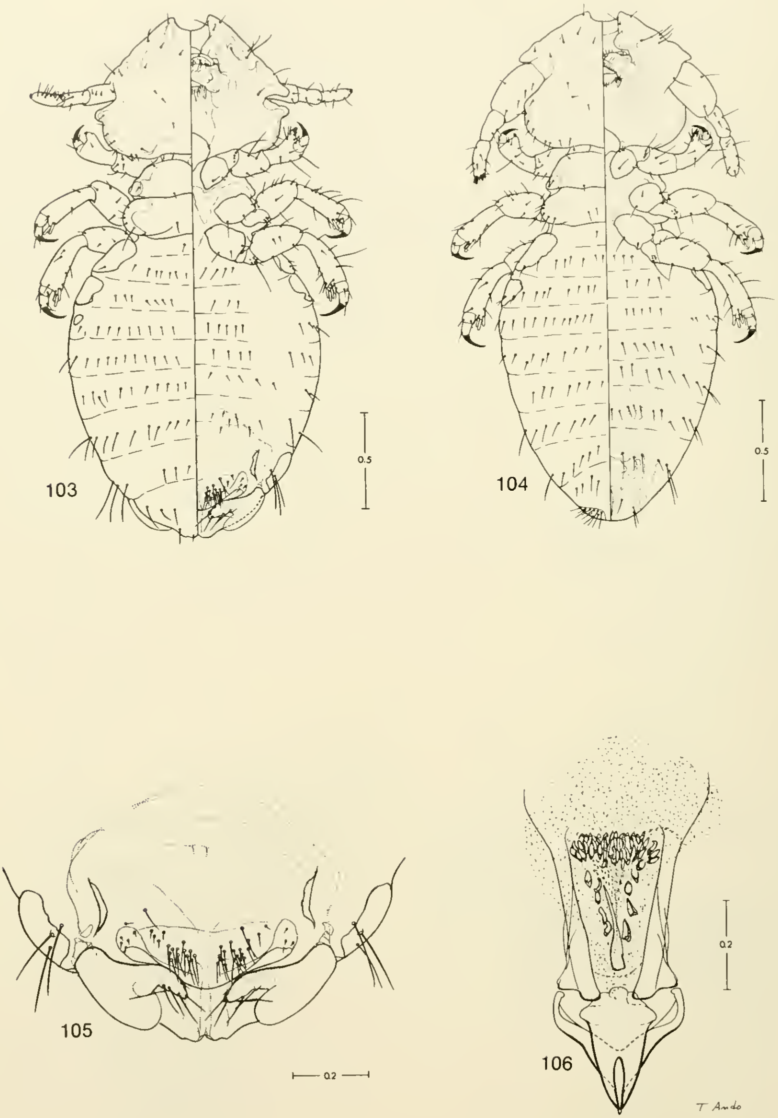


Fig. 99-102. *Aotiella aotophilus* (Ewing), from *Aotus trivirgatus*, T.F. Amazonas: 99, dorsal-ventral view of female; 100, dorsal-ventral view of male; 101, ventral view of female terminalia; 102, male genitalia.

Fig. 103-106. *Lymeon gastrodes* (Cummings), from *Choloepus didactylus*, T.F. Amazonas: 103, dorsal-ventral view of female; 104, dorsal-ventral view of male; 105, ventral view of female terminalia; 106, male genitalia.



VENEZUELAN RECORDS

Two males and two females were collected off *C. didactylus* at Belén, T. F. Amazonas. This is the first record since the description of the species.

Genus *Neotrichodectes* Ewing

Neotrichodectes Ewing, 1929:194. Type-species: *Trichodectes mephitidis* (Packard, 1872).

Neotrichodectes minutus (Paine)
(Fig. 107-110)

Trichodectes minutus Paine, 1912b:439, Pl. 20, Fig. 4.

The holotype was collected off *Mustela frenata noveboracensis* (Emmons) taken at Marshall, Illinois. It is common on *M. frenata* Lichtenstein in North America and probably occurs in Venezuela but it has not been reported there.

Neotrichodectes pallidus (Piaget)
(Fig. 111-114)

Trichodectes pallidus Piaget, 1880:405, Pl. 32, Fig. 9.

Trichodectes nasuatis Osborn, 1902:178, Pl. II, Fig. 3.

The holotype was collected off *Nasua fusca* Desmarest living in a zoo in Rotterdam. Werneck (1948) recorded it off *Nasua narica* (Linnaeus), *Nasua rufa* Desmarest, and *Nasua candace* Thomas taken in **Amazonas**, **Pará**, **Rio de Janeiro**, **São Paulo**, **Mato Grosso**, **Paraná** **Santa Catarina**, and **Distrito Federal**, Brazil. He also recorded it from Sta. Cruz de la Sierra, and Paraguai, Bolivia; Muzo, Colombia; **Cuernavaca**, México; and **Chiriquí**, Panamá. Emerson (1966) recorded it off *Nasua nasua* (Linnaeus) (= *Nasua narica* [Linnaeus]) taken at Almirante, **Bocas del Toro**, Panamá. Emerson (1971) also recorded it off *Nasua narica* (Linnaeus) taken at El Recreo, **Zelaya**, Nicaragua.

VENEZUELAN RECORDS

Three males and one female of *Neotrichodectes pallidus* were taken off a specimen of *Nasua nasua* at El Manaco, **Bolívar**.

Neotrichodectes semistriatus, new species
(Fig. 115-118)

Holotype male. External morphology and chaetotaxy as shown in Fig. 116. Head width 0.59 mm. Total length 1.87 mm. Genitalia (Fig. 118) 0.18 mm wide and 0.74 mm long; endomeral plate broadly bifurcate; parameral arch with very long medioposterior process, extending beyond endomeral plate by approximately length of plate; genital sac without evident sclerites.

Allotype female. External morphology and chaetotaxy as shown in Fig. 115. Head width 0.65 mm. Dorsal pigmentation of last segment only partially surrounding group of three setae on each side. Ventral terminalia as in Fig. 117; gonapophyses with median margin angulate and bearing setae, and with tips smoothly tapered; subgenital plate with cluster of long setae on each side; medioposterior margin of abdomen evenly rounded, with one seta on each side. Total length 1.65 mm.

Discussion. This species appears to be closest to *N. arizonae* (Werneck) collected off *Conepatus mesoleucus* (Lichtenstein) in Arizona. The gonapophyses of *N. arizonae* are broadly spatulate and irregular at the tip, even though Werneck (1948) illustrated them as tapered and regular. Examination of the type-material, as well as additional specimens of *N. arizonae*, confirmed that the female was erroneously illustrated in this feature. In determining this, we also confirmed the correctness of placing *N. spatulatus* Cook as a junior synonym of *N. arizonae*. Contrasted to this, the gonapophyses of *N. semistriatus* are tapered and regular, as in Fig. 117. An additional difference in the female concerns the dorsal pigmentation pattern of the last segment only partially surrounding the three setae in *N. semistriatus*, but completely surrounding these setae in *N. arizonae*. Also, the terminal seta on *N. arizonae* is on a distinct tuberculate protuberance, while that of *N. semistriatus* is on a gently rounded portion. The males of these two species are close, but the genitalic sclerites of *N. semistriatus* are larger than those of the other species.

Type-material. Holotype male, allotype female, and paratypes off *Conepatus semistriatus* (Boddaert) collected August 2, 1966, at Hato Mata de Bejuco, **Monagas**, Venezuela.

VENEZUELAN RECORDS

Type-material only.

Genus *Trichodectes* Nitzsch

Trichodectes Nitzsch, 1818:294.
Ursodectes Keler, 1938a:428.
Grisonia Keler, 1938a:464.
Galictobius Keler, 1938b:228.
Potusdia Conci, 1942:141.
Trigonodectes Keler, 1944:179 and 185.
Werneckodectes Conci, 1946:59.

Type-species: *Ricinus canis* DeGeer, 1778.

Fig. 107-110. *Neotrichodectes minutus* (Paine), from *Mustela frenata*. From Werneck, 1948:107, dorsal-ventral view of female; 108, dorsal-ventral view of male; 109, ventral view of female terminalia; 110, male genitalia.

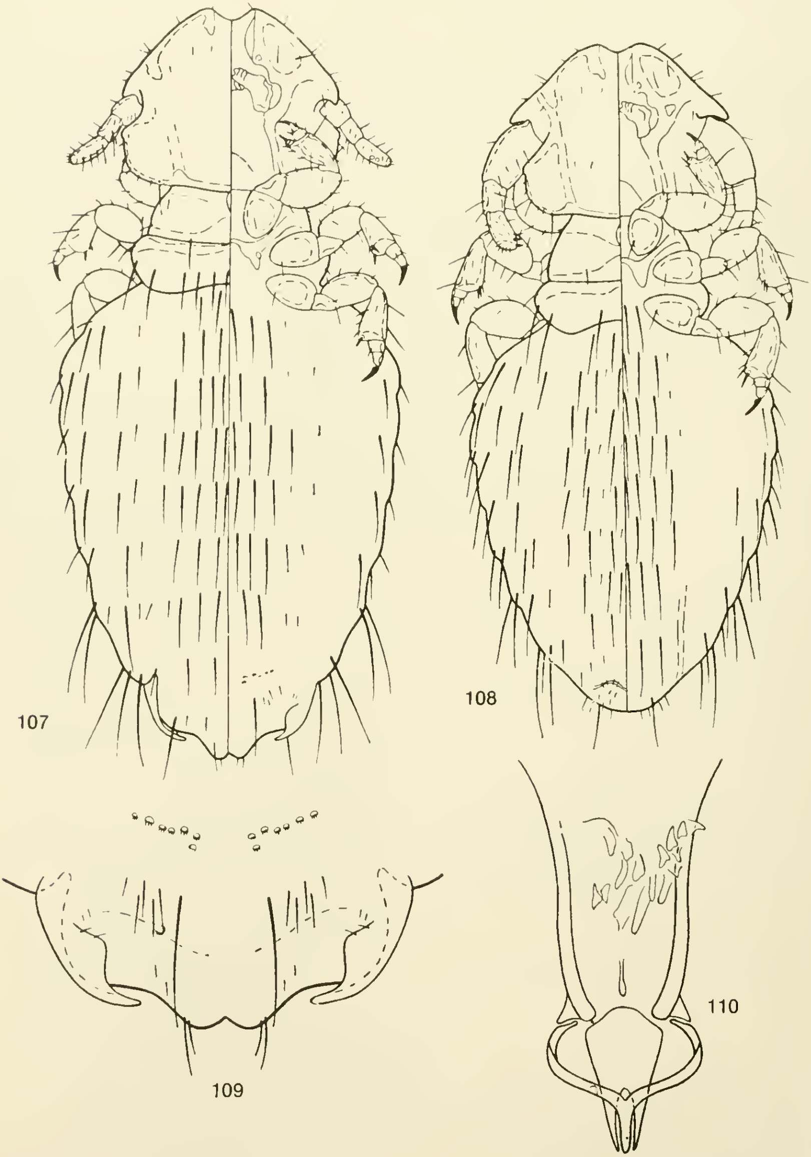
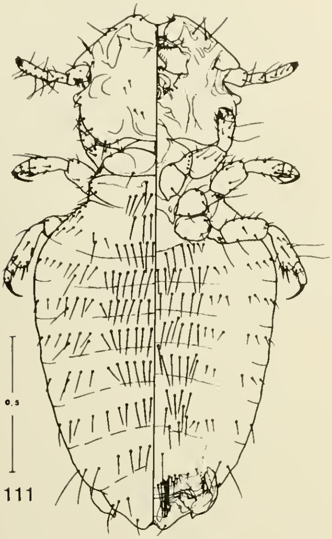


Fig. 111-114. *Neotrichodectes pallidus* (Piaget), from *Nasua narica*, Canal Zone, Panama: 111, dorsal-ventral view of female; 112, dorsal-ventral view of male; 113, ventral view of female terminalia; 114, male genitalia.



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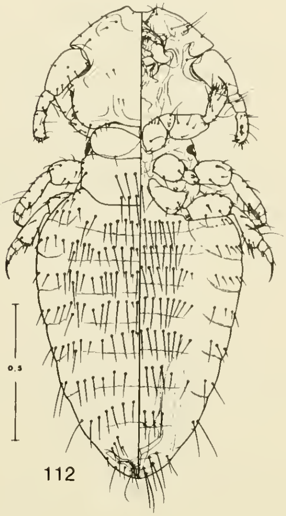

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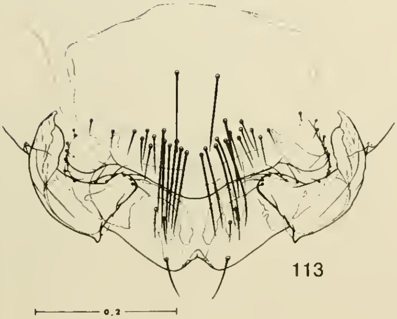

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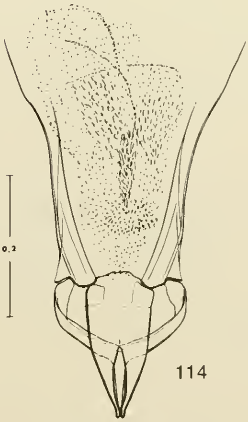
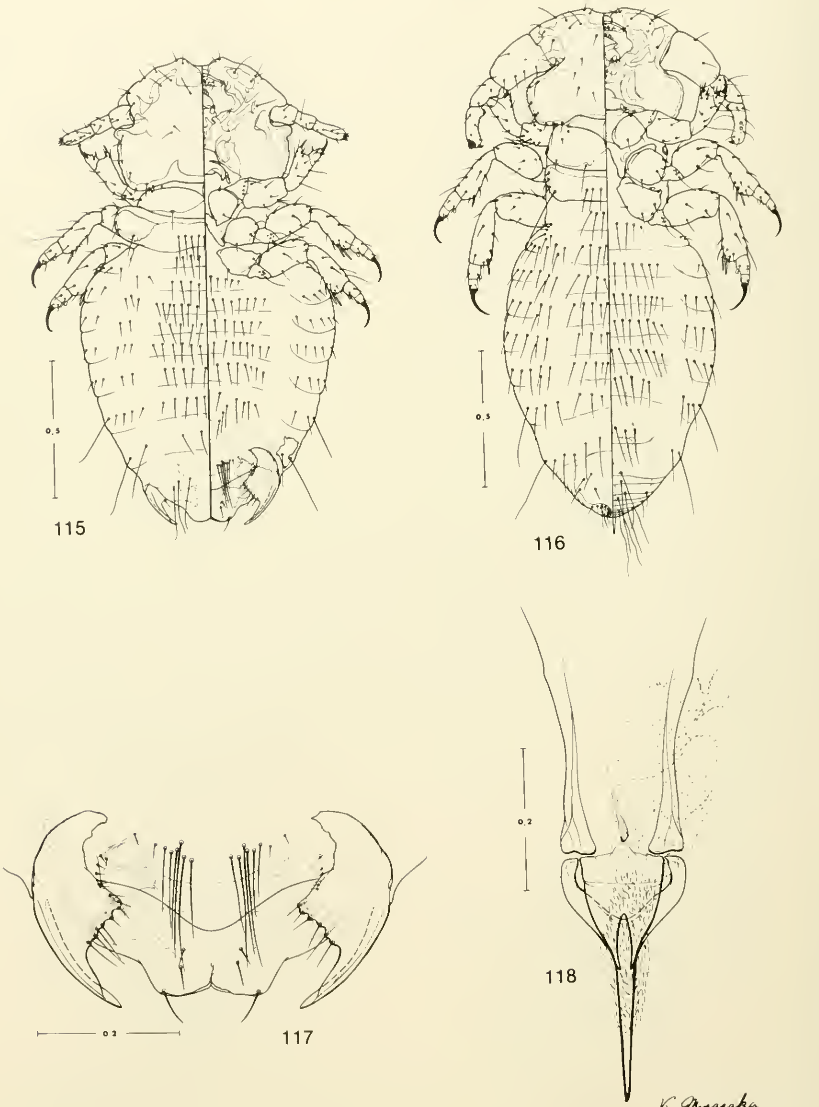


114

K. Miyasaka

Fig. 115-118. *Neotrichodectes semistriatus*, new species, from *Conepatus semistriatus*, Monagas: 115, dorsal-ventral view of female; 116, dorsal-ventral view of male; 117, ventral view of female terminalia; 118, male genitalia.



K. Miyasaka

Trichodectes canis (DeGeer)
(Fig. 119-122)

Ricinus canis DeGeer, 1778:81, Pl. 4, Fig. 16.
Trichodectes latus Nitzsch, 1818:296.
Trichodectes octopunctatus Denny, 1852:29.
Trichodectes riveti Neumann, 1913:614, Fig. 7-8.
Trichodectes floridanus McGregor, 1917:168, Pl. 16, Fig. 3 and 5.
Trichodectes latifrans Fahrenholz, 1919:363.

The holotype was collected off a domestic dog, *Canis familiaris* Linnaeus, in Europe. It has since been recorded off domestic and several species of wild dogs and wolves (genus *Canis*) in North America, Australia, China, Russia, Ecuador, and Brazil. This parasite probably also occurs in Venezuela, but it has not been recorded there.

Trichodectes barbarae Neumann
(Fig. 123-126)

Trichodectes barbarae Neumann, 1913:616, Fig. 9.

The holotype was collected off *Eira barbara* (Linnaeus) in Brazil. Werneck (1948) has recorded it off the type-host collected at Catende, **Pernambuco**; Santos, **São Paulo**; Alto Rio Doce, **Minas Gerais**; and Rio Cuyabá, **Mato Grosso**, in Brazil. He also recorded it off *Galera biologiae* (Thomas) (= *Eira barbara*) collected at San Juan, Costa Rica.

VENEZUELAN RECORDS

Two males and two females of *T. barbarae* were off a specimen of *Eira barbara* collected at El Rosario, **Zulia**.

Trichodectes fallax Werneck
(Fig. 127-130)

Trichodectes fallax Werneck, 1948:122, Fig. 159-165.

The holotype was collected off *Procyon cancrivorus* G. Cuvier at Guariba, **São Paulo**, Brazil. Werneck (1948) also recorded it off the same host collected at **Jujuy**, Argentina; and **Rio de Janeiro**, and **Mato Grosso**, Brazil. This parasite probably also occurs in Venezuela, but it has not been collected there.

Trichodectes galictidis Werneck
(Fig. 131-134)

Trichodectes mephitidis Neumann, 1913:618, Fig. 10 (*nec* Packard, 1872).
Trichodectes galictidis Werneck, 1934a:161, Fig. 1-5.
Trichodectes paranensis Keler, 1934:333, Fig. 55-57.

The holotype was collected off *Galictis vittata* Schreber in Manguinhos, **Distrito Federal**, Brazil. Keler collected his types off *Grisonella furax* Thomas at Rio de Areia, **Paraná**, Brazil. Werneck (1948) also recorded the species off the type-host collected in **Minas Gerais**, **São Paulo**, and **Santa Catarina** in Brazil; and Los Andes, Chile; and off *Grison canaster* Nelson (*Galictis vittata* Schreber) collected at Pacora, Panamá. This species probably occurs in Venezuela, but it has not been reported there.

Trichodectes ferrisi Werneck
(Fig. 135-138)

Trichodectes ferrisi Werneck, 1944b:257, Fig. 1-4.

The holotype was collected off *Tremarctos ornatus majori* Thomas at Rubío, **Tachira**, Venezuela. It has not been recorded since the description was published.

Trichodectes potus Werneck
(Fig. 139-142)

Trichodectes potus Werneck, 1934b:171, Fig. 7-10.

The holotype was collected off *Potos flavus* Schreber in Servia do Tingua, **Rio de Janeiro**, Brazil. Werneck (1948) also recorded it off the type-host collected at Abaete, **Pará**, Brazil, and Tuxpana, **Campeche**, México; and off *P. flavus meridensis* Thomas collected at Sierra de Mérida, Venezuela.

VENEZUELAN RECORDS

Thirty-three males and 54 females of *T. potus* were collected off 23 specimens of *P. flavus* collected at El Rosario, **Zulia**; near Icabarú, **Bolívar**; Nulita, **Apure**; and Alto ño León, **Distrito Federal**.

Comments. One host had 28 parasites, most had fewer than 6, and eight had only 1.

Genus *Suricatoecus* Bedford

Suricatoecus Bedford, 1932:354.
Bedfordia Keler, 1938a:463 (*nec* Fahrenholz).
Fastigatosculum Keler, 1939:11.
Eichlerella Conci, 1942:140.

Type-species: *Trichodectes cooleyi* Bedford, 1929.

Fig. 119-122. *Trichodectes canis* (DeGeer), from *Canis familiaris.* From Werneck, 1948:119, dorsal-ventral view of female; 120, dorsal-ventral view of male; 121. ventral view of female terminalia; 122, male genitalia.

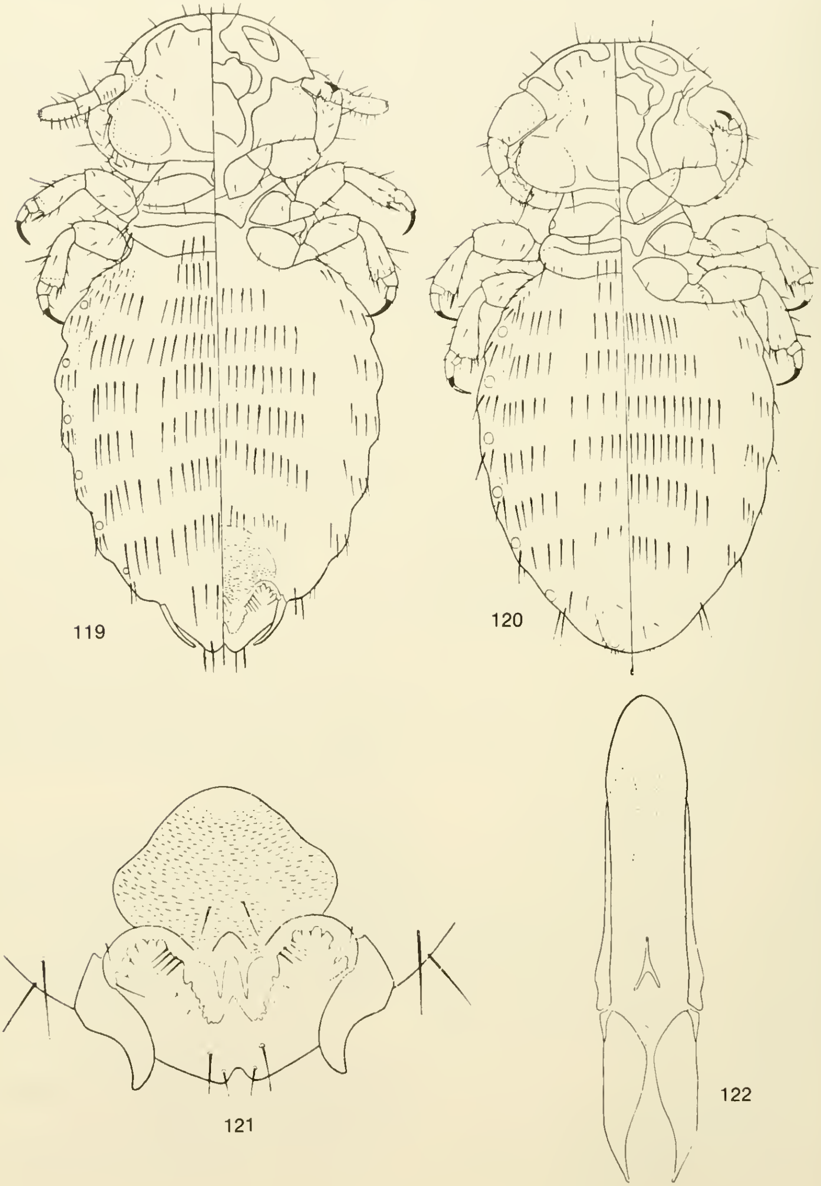
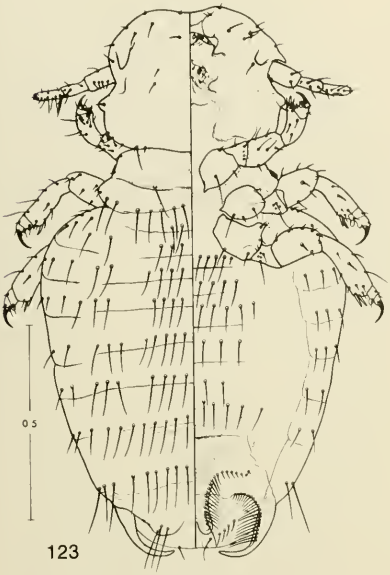


Fig. 123-126. *Trichodectes barbarae* Neumann, from *Eira barbara*, Zulia: 123, dorsal-ventral view of female; 124, dorsal-ventral view of male; 125, ventral view of female terminalia; 126, male genitalia.



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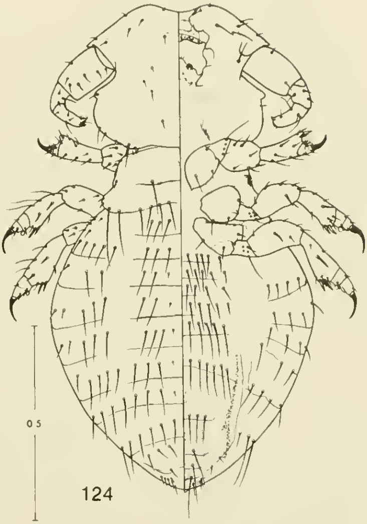

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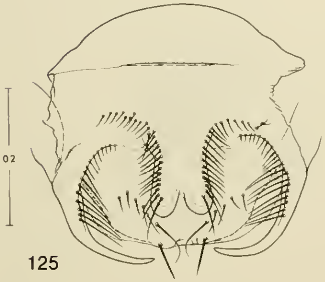

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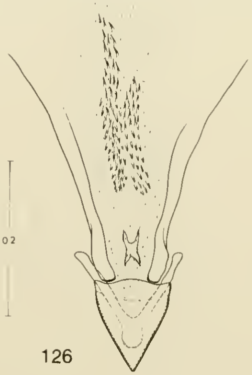

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Fig. 127-130. *Trichodectes fallax* Werneck, from *Procyon cancrivorus*. From Werneck, 1948: 127, dorsal-ventral view of female; 128, dorsal-ventral view of male; 129, ventral view of female terminalia; 130, male genitalia.

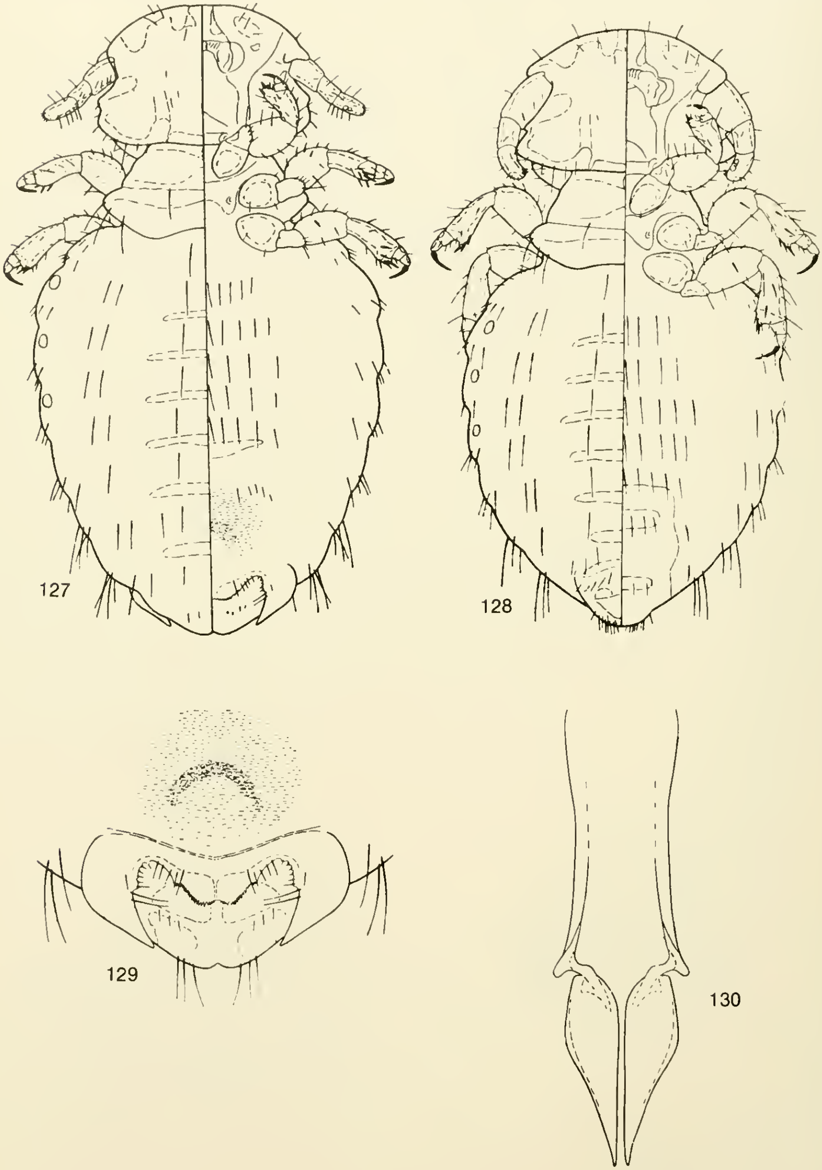


Fig. 131-134. *Trichodectes galictidis* Werneck, from *Galictis vittata*. From Werneck, 1943a: 131, dorsal-ventral view of female; 132, dorsal-ventral view of male, 133, ventral view of female terminalia; 134, male genitalia.

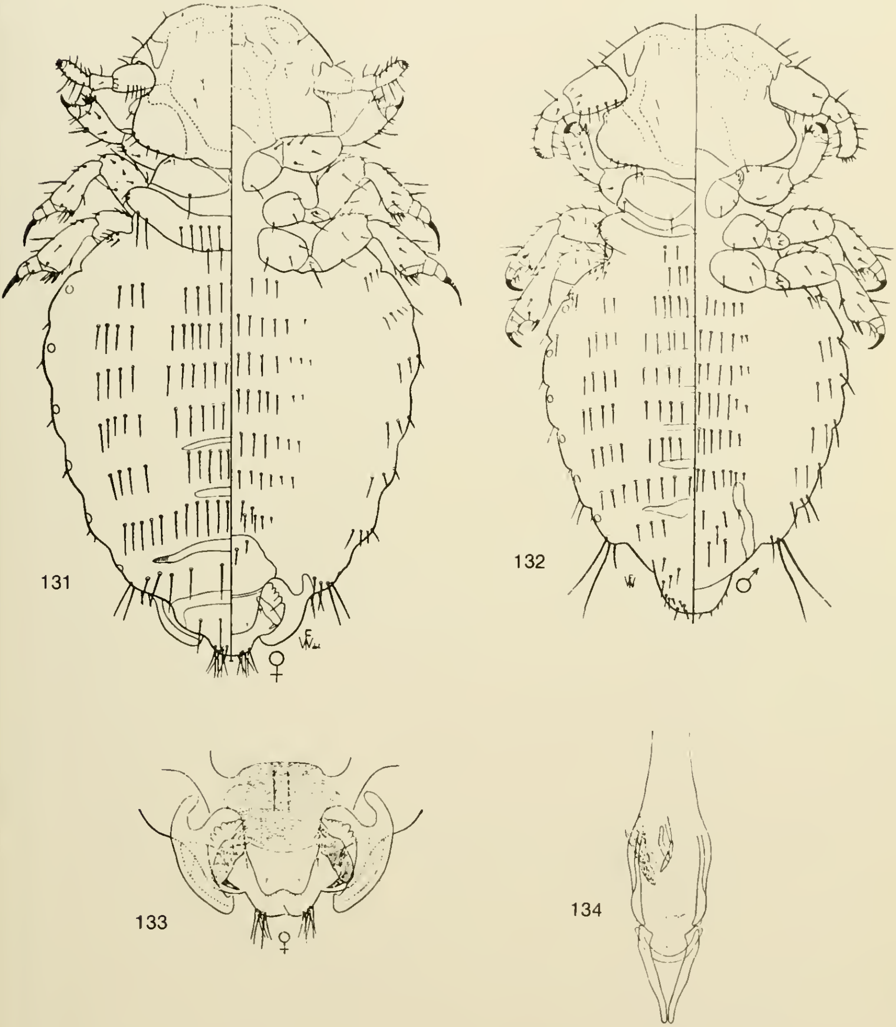


Fig. 135-138. *Trichodectes ferrisi* Werneck, from *Tremarctos ornatus*. From Werneck, 1944b:135, dorsal-ventral view of female; 136, dorsal-ventral view of male; 137, ventral view of female terminalia; 138, male genitalia.

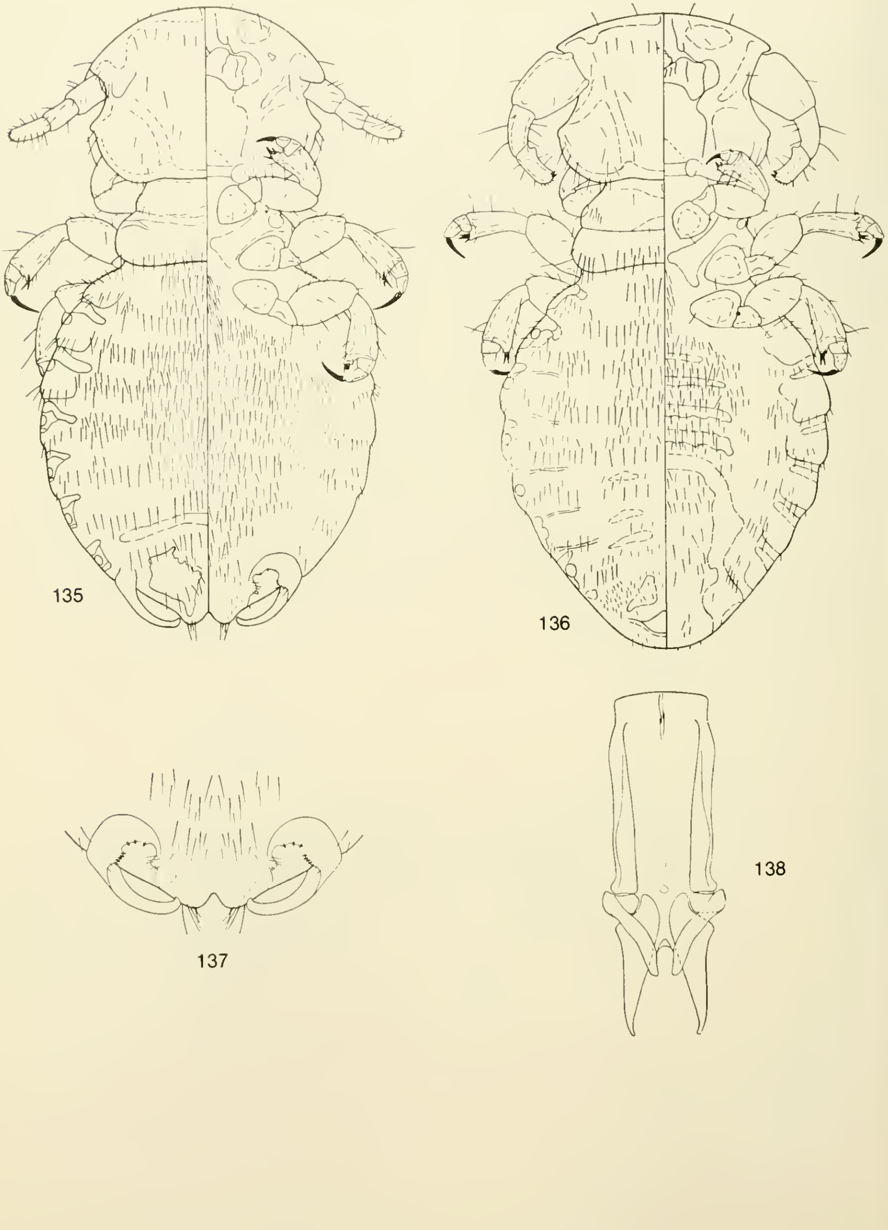
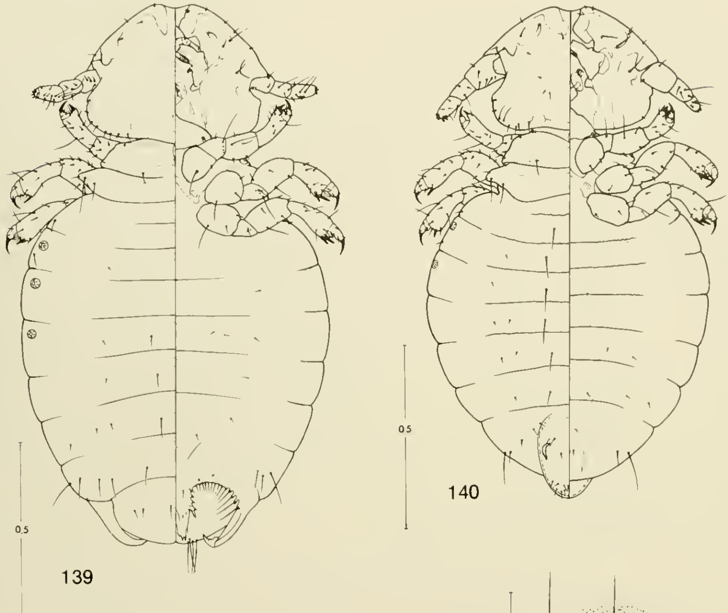


Fig. 139-142. *Trichodectes potus* Werneck, from *Potos flavus,* Trujillo: 139, dorsal-ventral view of female; 140, dorsal-ventral view of male; 141, ventral view of female terminalia; 142, male genitalia.



Suricatoecus quadraticeps (Chapman)
(Fig. 143-146)

Trichodectes quadraticeps Chapman, 1897:185, Pl. 9, Fig. 2.

The holotype was collected off *Urocyon cinereoargenteus sequoiensis* Dixon taken at Freestone, California. It is a common parasite on *U. cinereoargenteus* (Schreber) in North America and probably occurs in Venezuela, but it has not been recorded there.

Genus *Felicola* Ewing

Felicola Ewing, 1929:192.
Felicinia Bedford, 1929:519.
Protelicola Bedford, 1932:354.
Paradoxuroecus Conci, 1942:141.

Type-species: *Trichodectes subrostratus* Burmeister, 1838.

Felicola subrostratus (Burmeister)
(Fig. 147-150)

Trichodectes subrostratus Nitzsch, 1818:296 (*nomen nudum*).
Trichodectes subrostratus Stephens, 1829:330 (*nomen nudum*).
Trichodectes subrostratus Burmeister, 1838:436.
Felicola rostrata Bedford, 1932:360, Fig. 6a-c.

The holotype was collected off a domestic cat (*Felis catus* Linnaeus) in Europe. It is distributed worldwide on that host. Werneck (1948) recorded it off the domestic cat in Brazil and Guyana; it probably also occurs in Venezuela, but it has not been recorded there.

Felicola felis (Werneck)
(Fig. 151-154)

Trichodectes felis Werneck, 1934c:282, Fig. 11-14.

The holotype was collected off *Felis chibigouazou* Gray (*Felis pardalis* Linnaeus) at Rio Cuiabá, Mato Grosso, Brazil. Werneck (1948) recorded it off *Felis concolor* Linnaeus, *Felis geoffroyi* D'Orbigny and Gervais, *Felis pajeros* Desmarest (*Felis colocolo* Molina), and *Felis yagouaroundi* E. Geoffroy collected in various localities in Brazil; and off *Lynx rufus* (Schreber) in the United States.

Venezuelan Records

Two females were taken off *F. yagouaroundi* collected at Hato Mata de Bejuco, 55 km SSE Maturín, Monagas. Illustrations of the male are of specimens taken off *F. yagouaroundi* collected at Juan del Zalazar, Boquerón, Paraguay. Specimens from each of the hosts listed by Werneck have not been studied by the authors, so it cannot be determined if they are conspecific.

Genus *Cebidicola* Bedford

Cebidicola Bedford, 1936:52.
Meganarion Keler, 1938a:465.

Type-species: *Trichodectes armatus* Neumann, 1913.

Cebidicola armatus (Neumann)
(Fig. 155-158)

Trichodectes armatus Neumann, 1913:608, Fig. 1-3.

The holotype was collected off *Eriodes arachnoids* E. Goeffroy (= *Brachyteles arachnoides* [E. Geoffroy]) in Brazil, without specific locality. Werneck (1950) recorded the species off the type-host and "*Cebus fuscus* E. Geoffroy" (=?) from many localities in Brazil. It probably is found in Venezuela on hosts of the genus *Cebus*, but it has not been reported there.

Cebidicola semiarmatus (Neumann)
(Fig. 159-162)

Trichodectes semiarmatus Neumann, 1913:611, Fig. 5.

The holotype was collected off *Alouatta ursina* (Humboldt) (= *Alouatta guariba* Humboldt or *Alouatta seniculus* [Linnaeus]) in Brazil, without specific locality. Stafford (1943) recorded it off *A. seniculus* collected at San Fernando de Apure, Apure, Venezuela. Werneck (1950) recorded it off *A. guariba* collected in various localities in Espirito Santo and São Paulo, Brazil. He also recorded it off *A. caraya* (Humboldt) and *A. belzebul* (Linnaeus) from several localities in Brazil.

Cebidicola extrarius Werneck
(Fig. 163-166)

Cebidicola extrarius Werneck, 1950:8, Fig. 10-11.

The host of the holotype and the locality where it was collected are unknown.

Venezuelan Records

Nineteen males and 20 females were taken off *Alouatta seniculus* (Linnaeus) collected near Mirimiri, Falcón; El Rosario, Zulia; and Hato Mata de Bejuco, Monagas. Based upon

Fig. 143-146. *Suricatoecus quadraticeps* (Chapman), from *Urocyon cinereoargenteus*. From Werneck, 1948: 143, dorsal-ventral view of female; 144, dorsal-ventral view of male; 145, ventral view of female terminalia; 146, male genitalia.

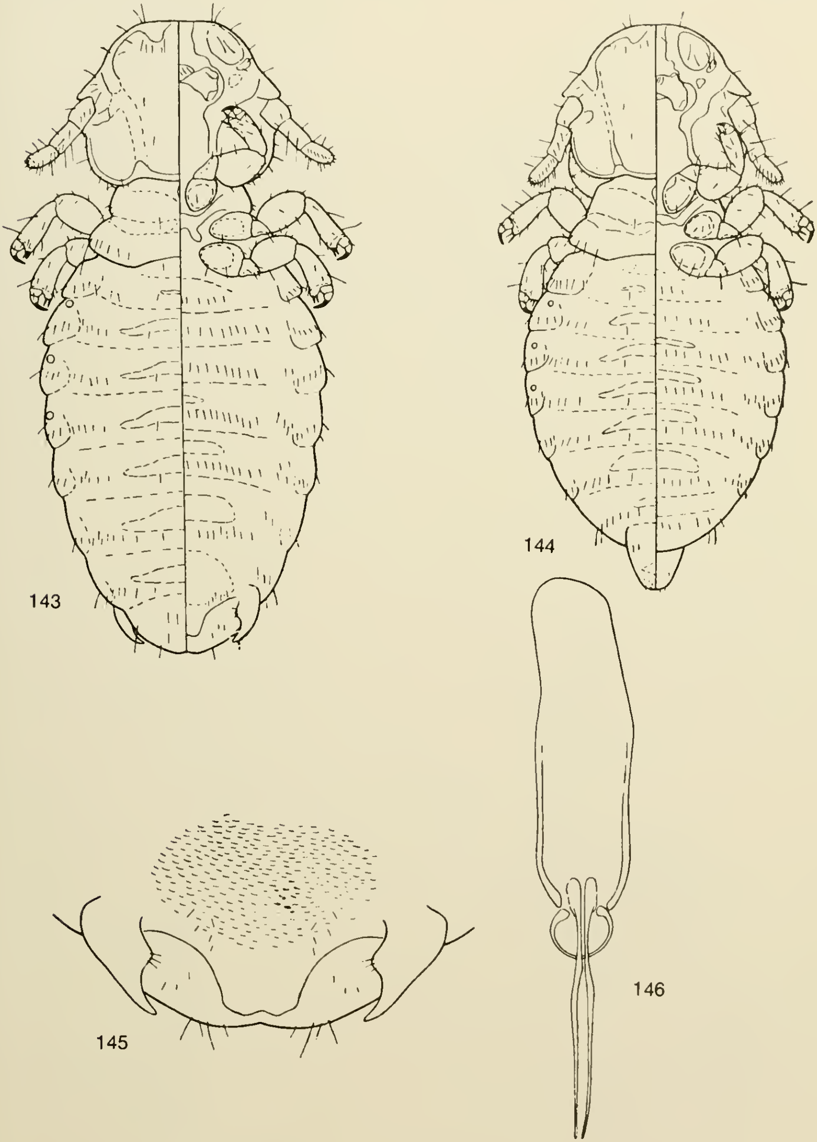


Fig. 147-150. *Felicola subrostratus* (Burmeister), from *Felis catus*. From Werneck, 1948:147, dorsal-ventral view of female; 148, dorsal-ventral view of male; 149, ventral view of female terminalia; 150, male genitalia.

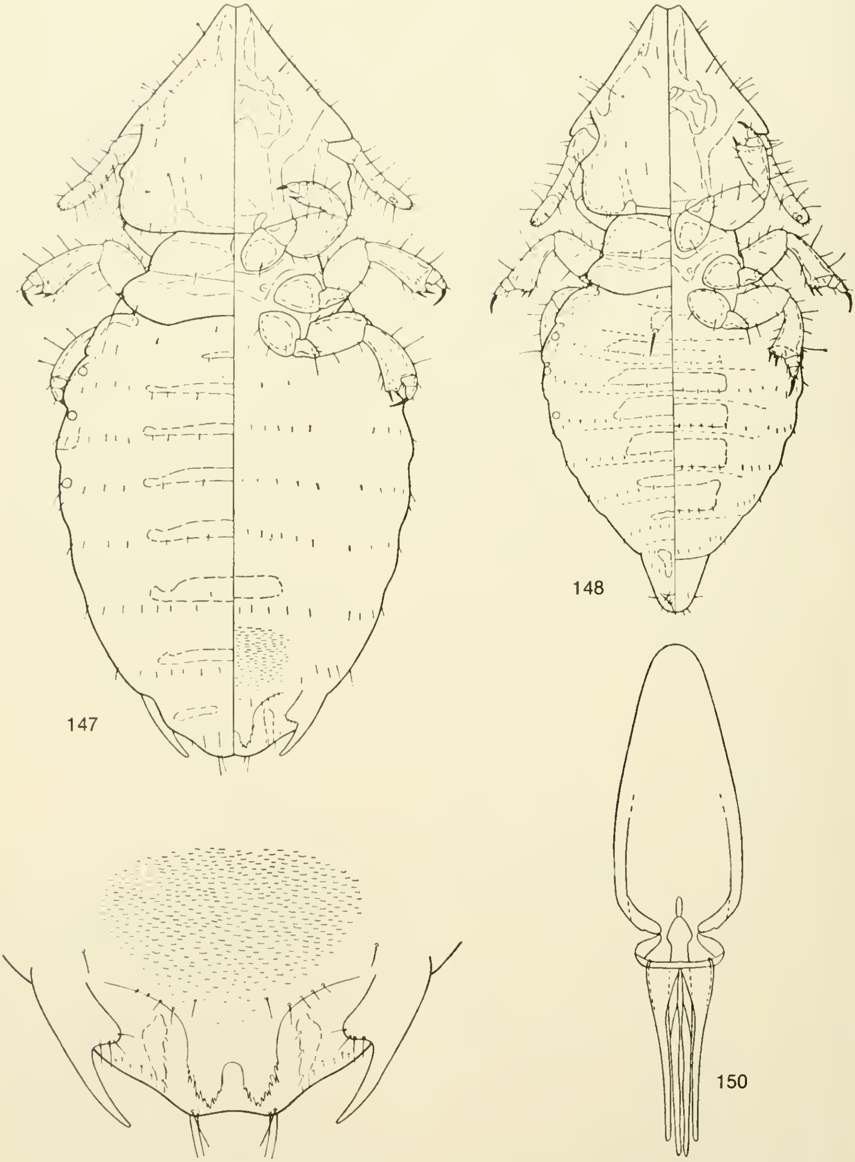
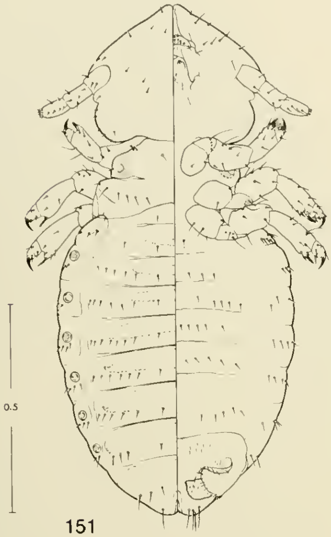


Fig. 151-154. *Felicola felis* (Werneck), from *Felis yagouaroundi*, Monagas, Venezuela, and Boqueron, Bolivia: 151, dorsal-ventral view of female; 152, dorsal-ventral view of male; 153, ventral view of female terminalia; 154, male genitalia.



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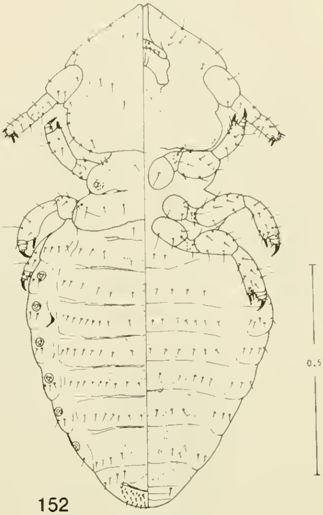

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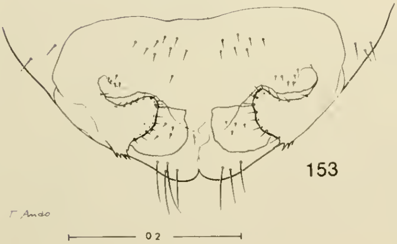

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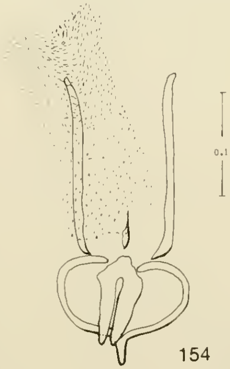

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Fig. 155-158. *Cebidicola armatus* (Neumann), from *Brachyteles arachnoides*. From Werneck, 1936:155, dorsal-ventral view of female; 156, dorsal-ventral view of male; 157, ventral view of female terminalia; 158, male genitalia.

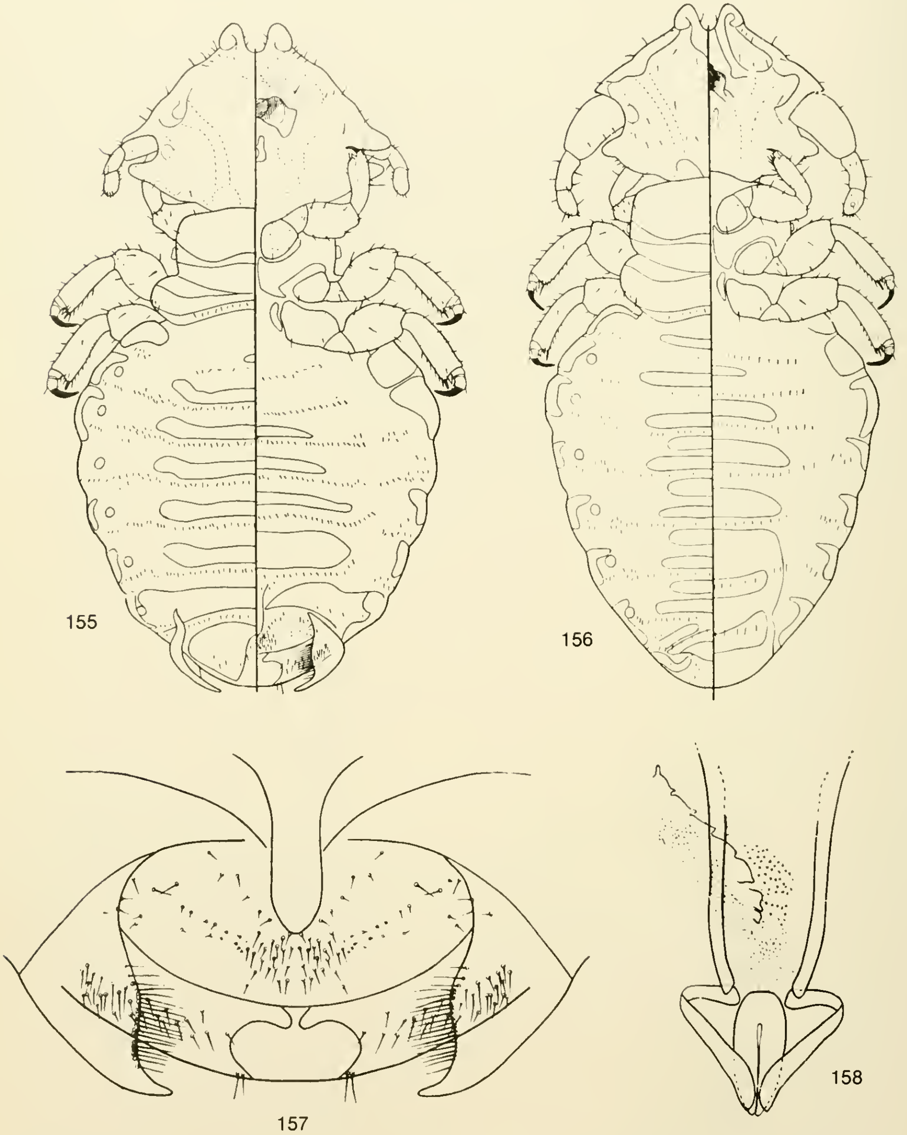


Fig. 159-162. *Cebidicola semiarmatus* (Neumann), from *Alouatta ursina.* From Werneck, 1936:159, dorsal-ventral view of female; 160, dorsal-ventral view of male; 161, ventral view of female terminalia; 162, male genitalia.

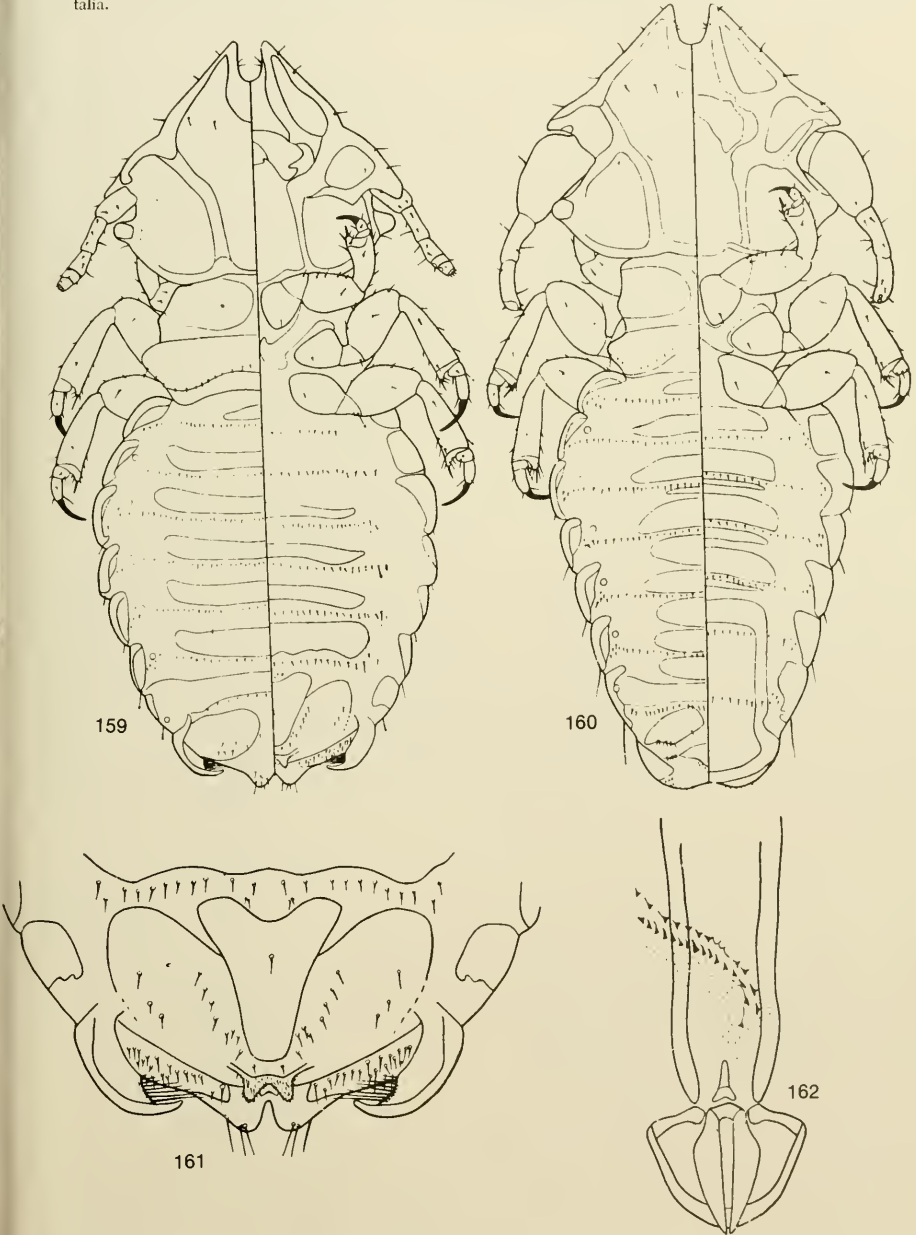
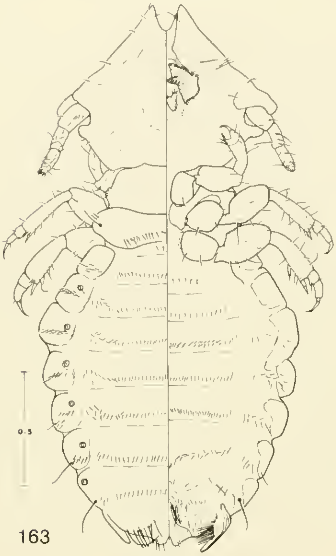


Fig. 163-166. *Cebidicola extrarius* Werneck, from *Alouatta seniculus*, Monagas: 163, dorsal-ventral view of female; 164, dorsal-ventral view of male; 165, ventral view of female terminalia; 166, male genitalia.



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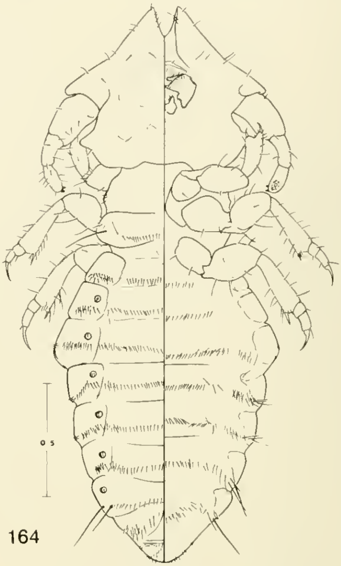

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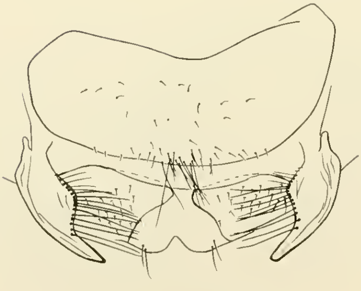

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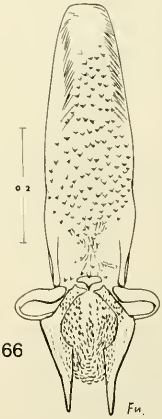


166

these records it must be assumed that the true host of this species is one of the howler monkeys.

Genus *Eutrichophilus* Mjöberg

Eutrichophilus Mjöberg, 1910:71. Type-species: *Eutrichophilus cercolabes* Mjöberg, 1910.

Eutrichophilus cercolabes Mjöberg
(Fig. 167-170)

Eutrichophilus cercolabes Mjöberg, 1910:72, Pl. 4, Fig. 7-8.

The holotype was collected off *Coendou prehensilis* (Linnaeus) at Colonia de Santa Cruz, Rio Grande do Sul, Brazil. Werneck (1950) also recorded it off *Coendou villosus* Cuvier (= *Coendou spinosus* Cuvier) in Brazil and Paraguay. It probably is also found in Venezuela, although it has not been reported there. The authors have seen specimens from *C. villosus* collected at Villarica, Paraguay.

Eutrichophilus cordiceps Mjöberg
(Fig. 171-174)

Eutrichophilus cordiceps Mjöberg, 1910:75, Pl. 4, Fig. 5-6.

The holotype was collected off *Coendou prehensilis* (Linnaeus) at Colonia de Santa Cruz, Rio Grande do Sul, Brazil. Werneck (1950) also recorded it off *Coendou villosus* Cuvier (= *C. spinosus*), *C. platycentrotus* Brandt (= *C. prehensilis*), and *C. paraguayensis* Oken (=*C. insidious* Kuhl) collected in Brazil. It probably is also found in Venezuela, but it has not been reported there.

Eutrichophilus guyanensis Werneck
(Fig. 175-178)

Eutrichophilus guyanensis Werneck, 1950:49, Fig. 29-35.

The holotype was collected off *Coendou melanurus* (Wagner) in Kartabo, Guyana. The authors have seen specimens from "a porcupine" collected at Moengo, Surinam. It probably occurs in Venezuela, but there are no reports of it there.

Eutrichophilus exiguus Werneck
(Fig. 179-182)

Eutrichophilus exiguus Werneck, 1950:52, Fig. 36-41.

The holotype was collected off *Coendou melanurus* (Wagner) in Kartabo, Guyana. It probably occurs in Venezuela, although it has not been reported there.

Eutrichophilus lobatus Ewing
(Fig. 183-186)

Eutrichophilus lobatus Ewing, 1936:238, Fig. 2.

The holotype was collected off *Coendou pruinosus* Thomas taken in "South America," without specific locality. *C. pruinosus*, however, is known only from Venezuela. Werneck (1950) recorded it off the type-host collected at Mérida, Venezuela; and off *C. vestitus* Thomas collected at Bogotá, Colombia.

Eutrichophilus comitans Werneck
(Fig. 187-188)

Eutrichophilus comitans Werneck, 1950:56, Fig. 42-43.

The holotype was collected off *Coendou vestitus* Thomas in Colombia. Werneck (1950) also found it on *Coendou pruinosus* Thomas collected at Mérida, Venezuela.

Eutrichophilus minor Mjöberg
(Fig. 189-192)

Eutrichophilus minor Mjöberg, 1910:77, Fig. 44, 47, 48, 112, and Pl. 4, Fig. 3.

The holotype was collected off *Coendou prehensilis* (Linnaeus) at Colonia de Santa Cruz, Rio Grande do Sul, Brazil. Werneck (1950) recorded it off *Coendou villosus* Cuvier (= *C. spinosus* Cuvier) from Brazil and Paraguay and off *Coendou paraguayensis* Oken (= *C. insidious* Kuhl) from Minas Gerais, Brazil. It probably occurs in Venezuela, although it has not been reported there.

Genus *Bovicola* Ewing

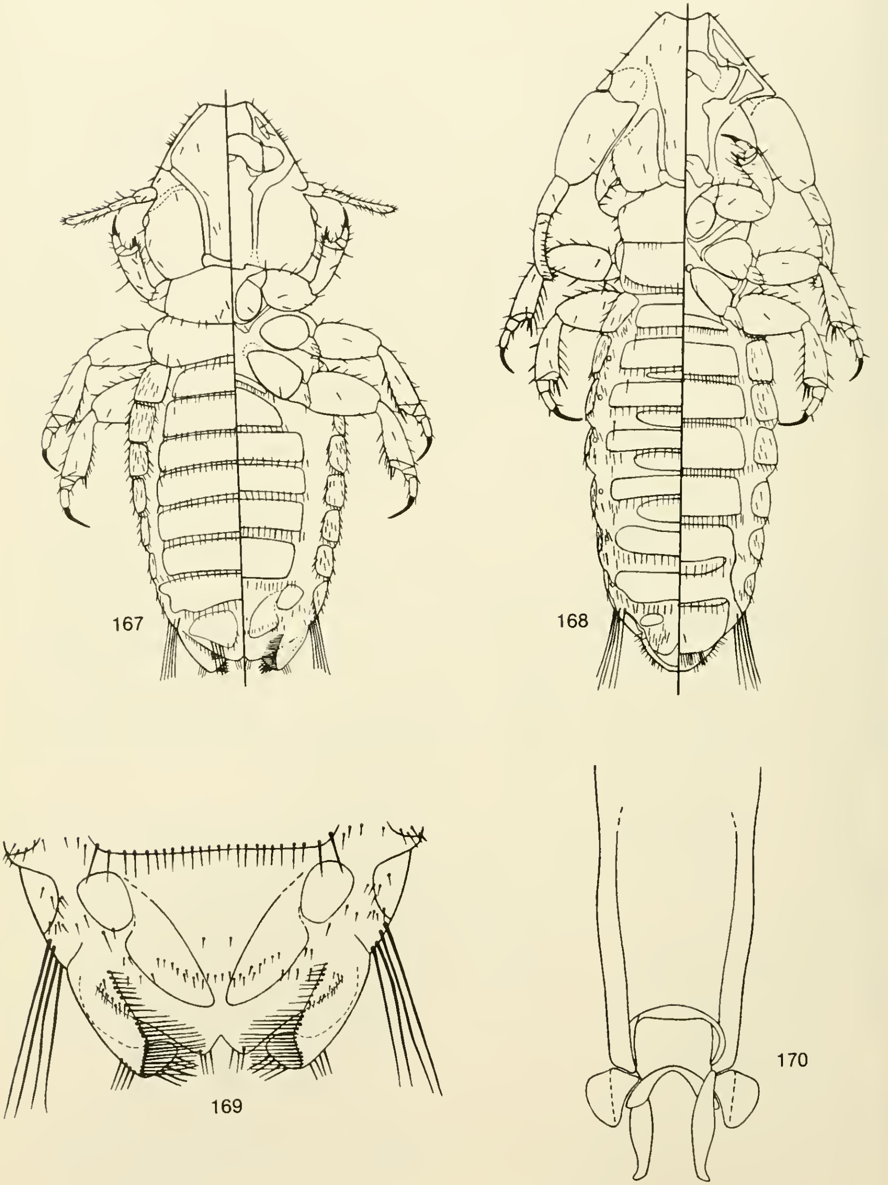
Bovicola Ewing, 1929:193.
Bovidoecus Bedford, 1929:518.
Lepikentron Keler, 1938a:452.
Rhabdopedilon Keler, 1938a:453.
Holakartikos Keler, 1938a:461.
Werneckiella Eichler, 1940:160.

Type-species: *Trichodectes caprae* Gurlt, 1843.

Bovicola caprae (Gurlt)
(Fig. 193-196)

Trichodectes climax Nitzsch, 1818:296 (*nomen nudum*).
Trichodectes caprae Gurlt, 1843:3, Pl. 1, Fig. 2.
Trichodectes climacium Giebel, 1861b:292.

Fig. 167-170. *Eutrichophilus cercolabes* Mjöberg, from *Coendou prehensilis*. From Werneck, 1936:167, dorsal-ventral view of female; 168, dorsal-ventral view of male; 169, ventral view of female terminalia; 170, male genitalia.



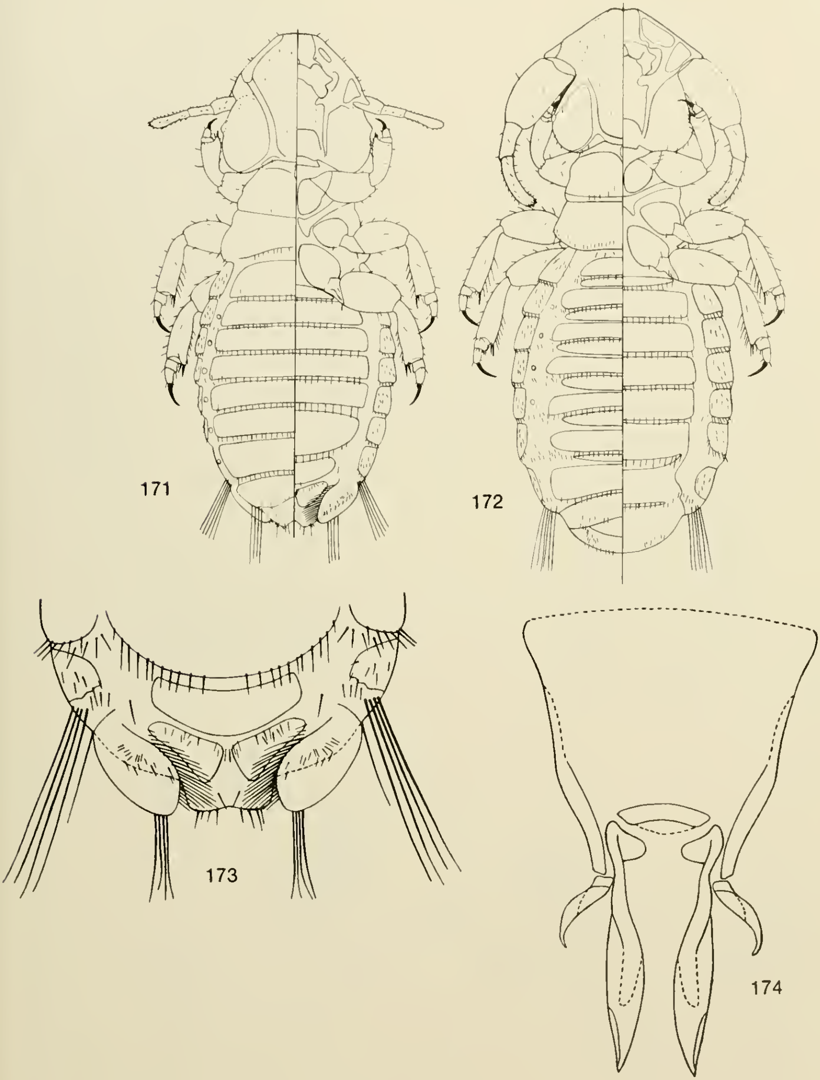


Fig. 171-174. *Eutrichophilus cordiceps* Mjöberg, from *Coendou prehensilis.* From Werneck, 1936: 171, dorsal-ventral view of female; 172, dorsal-ventral view of male; 173, ventral view of female terminalia; 174, male genitalia.

Fig. 175-178. *Eutrichophilus guyannensis* Werneck, from *Coendou melanurus*. From Werneck, 1950:175, dorsal-ventral view of female; 176, dorsal-ventral view of male; 177, ventral view of female terminalia; 178, male genitalia.

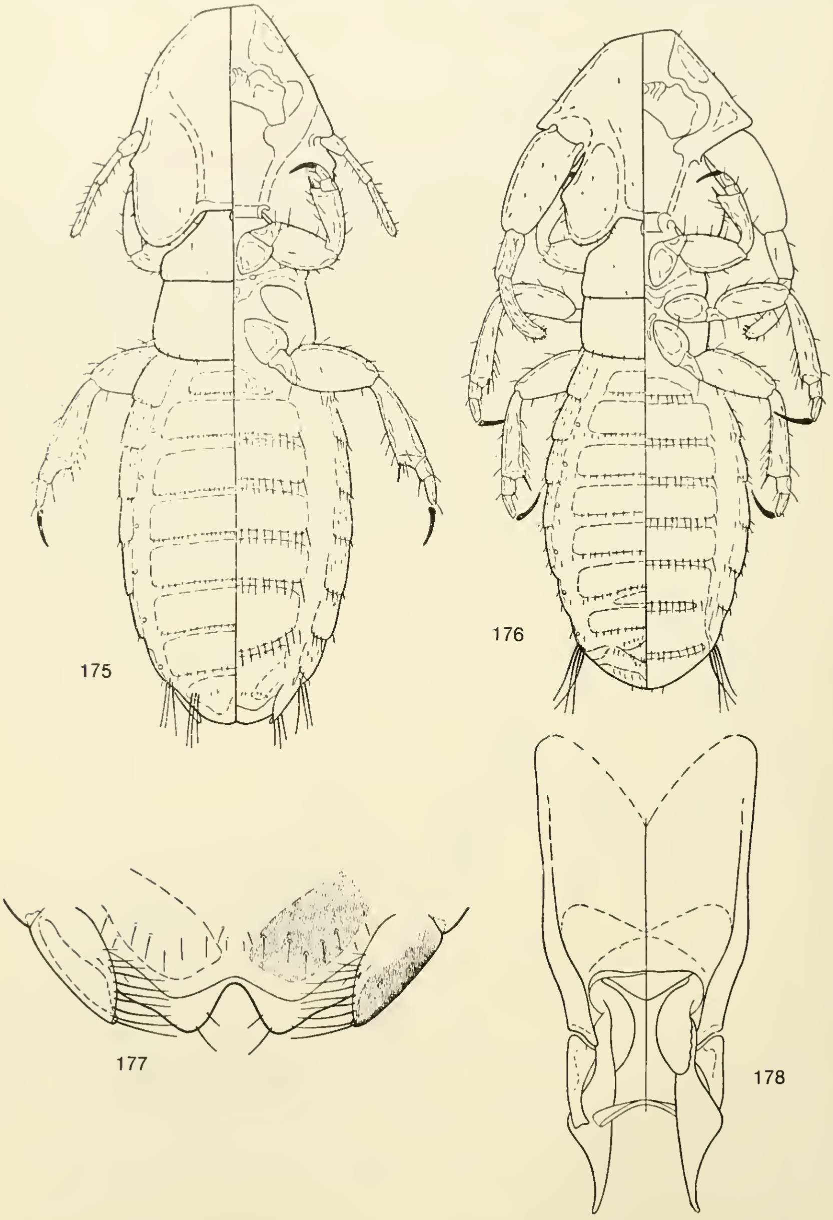


Fig. 179-182. *Eutrichophilus exiguus* Werneck, from *Coendou melanurus*. From Werneck, 1950: 179, dorsal-ventral view of female; 180, dorsal-ventral view of male; 181, ventral view of female terminalia; 182, male genitalia.

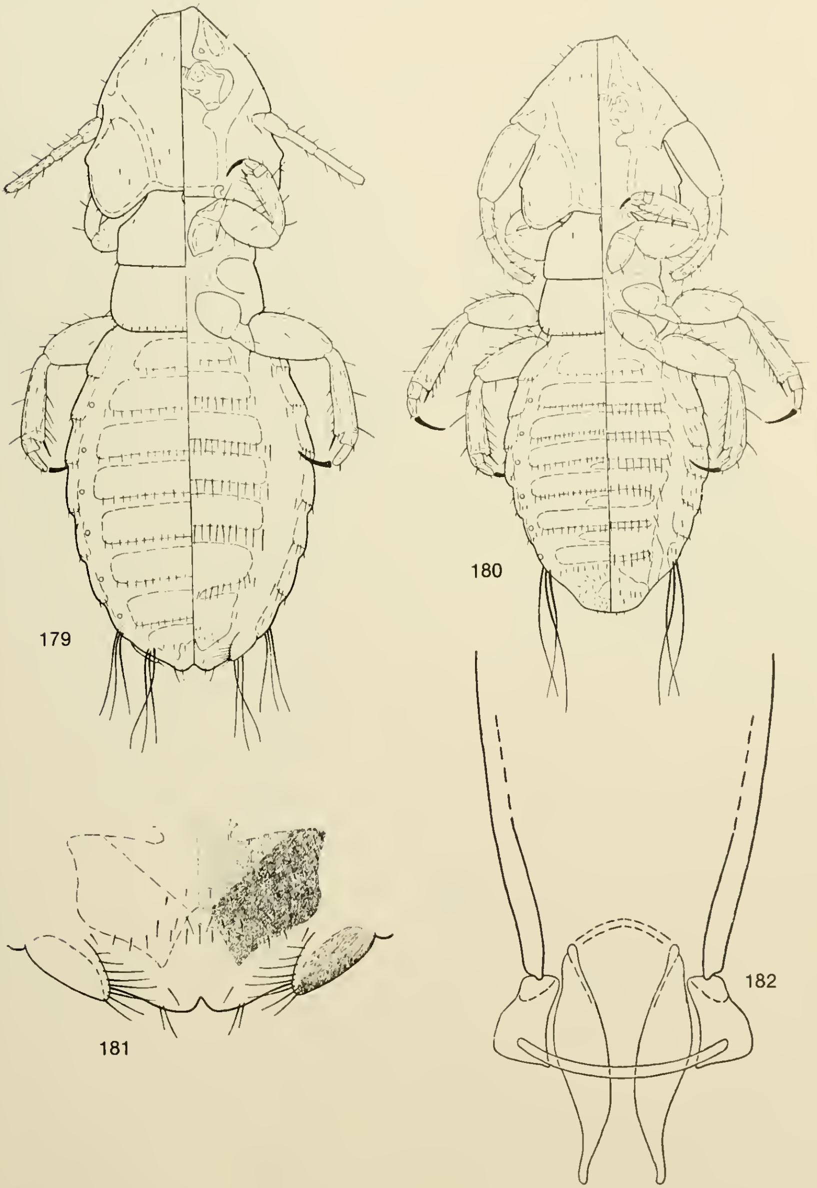


Fig. 183-186. *Eutrichophilus lobatus* Ewing, from *Coendou pruinosus*. From Werneck, 1945: 183, dorsal-ventral view of female; 184, dorsal-ventral view of male; 185, ventral view of female terminalia; 186, male genitalia.

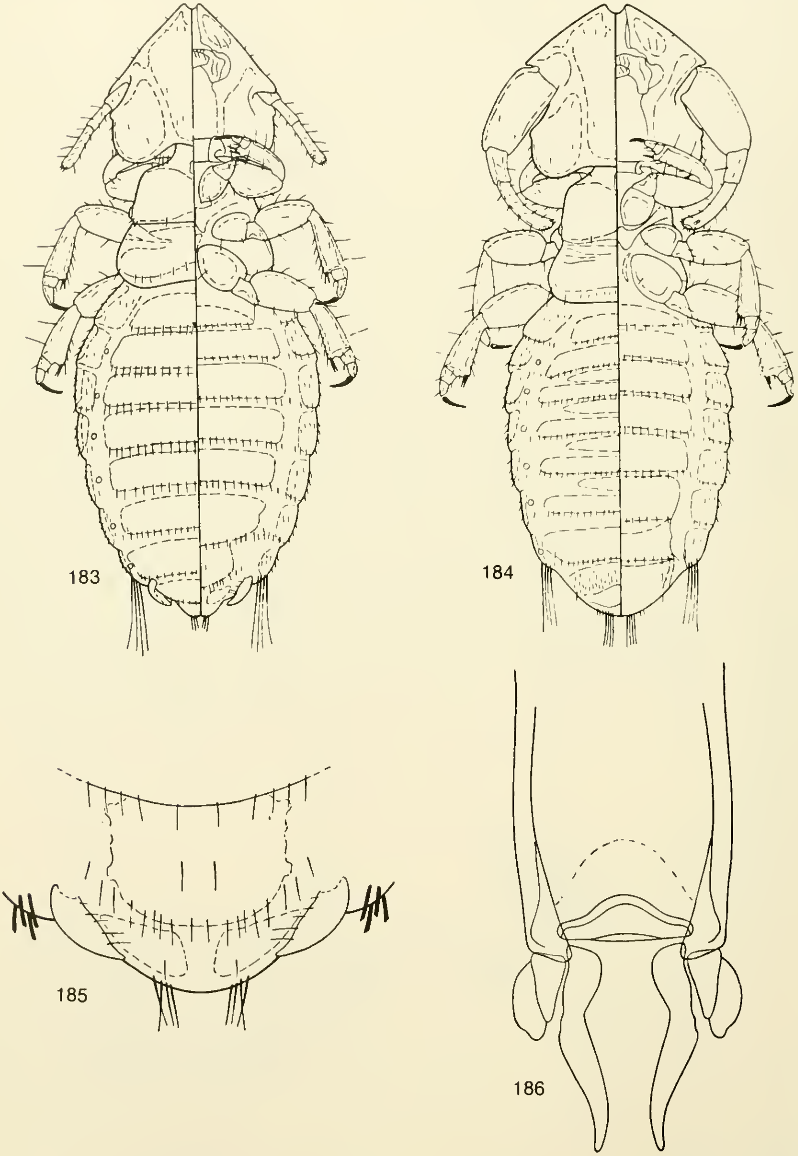
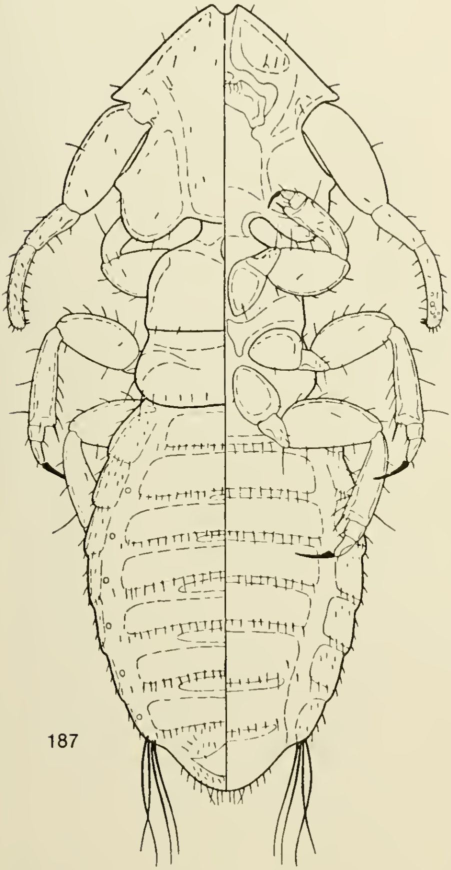


Fig. 187-188. *Eutrichophilus comitans* Werneck, from *Coendou vestitus*. From Werneck, 1950:187, dorsal-ventral view of male; 188, male genitalia.



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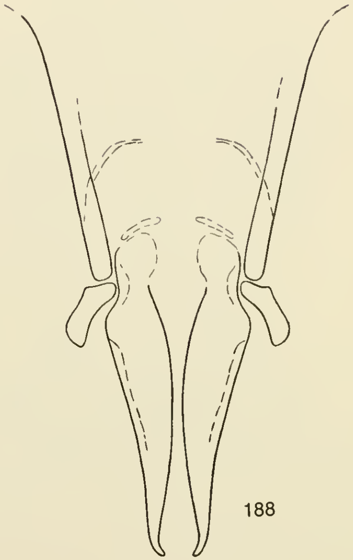

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Fig. 189-192. *Eutrichophilus minor* Mjöberg, from *Coendou prehensilis*. From Werneck, 1936: 189, dorsal-ventral view of female; 190, dorsal-ventral view of male; 191, ventral view of female terminalia; 192, male genitalia.

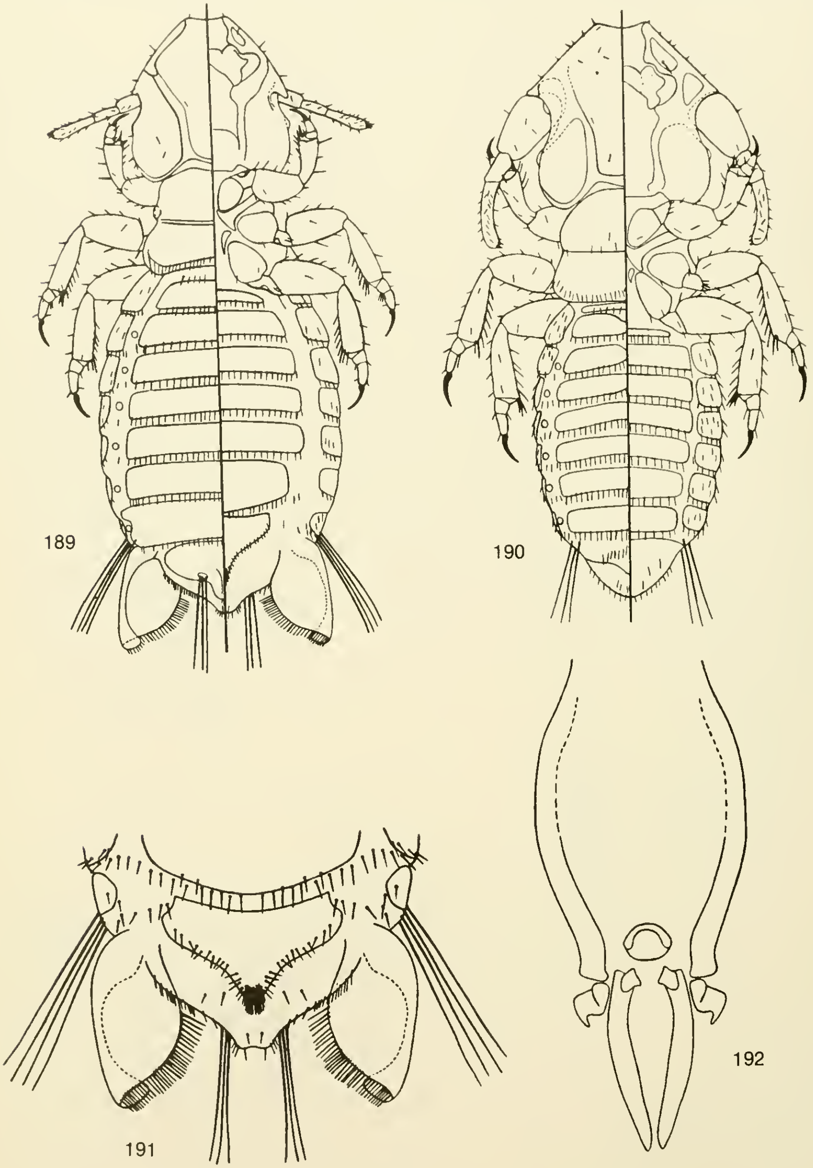
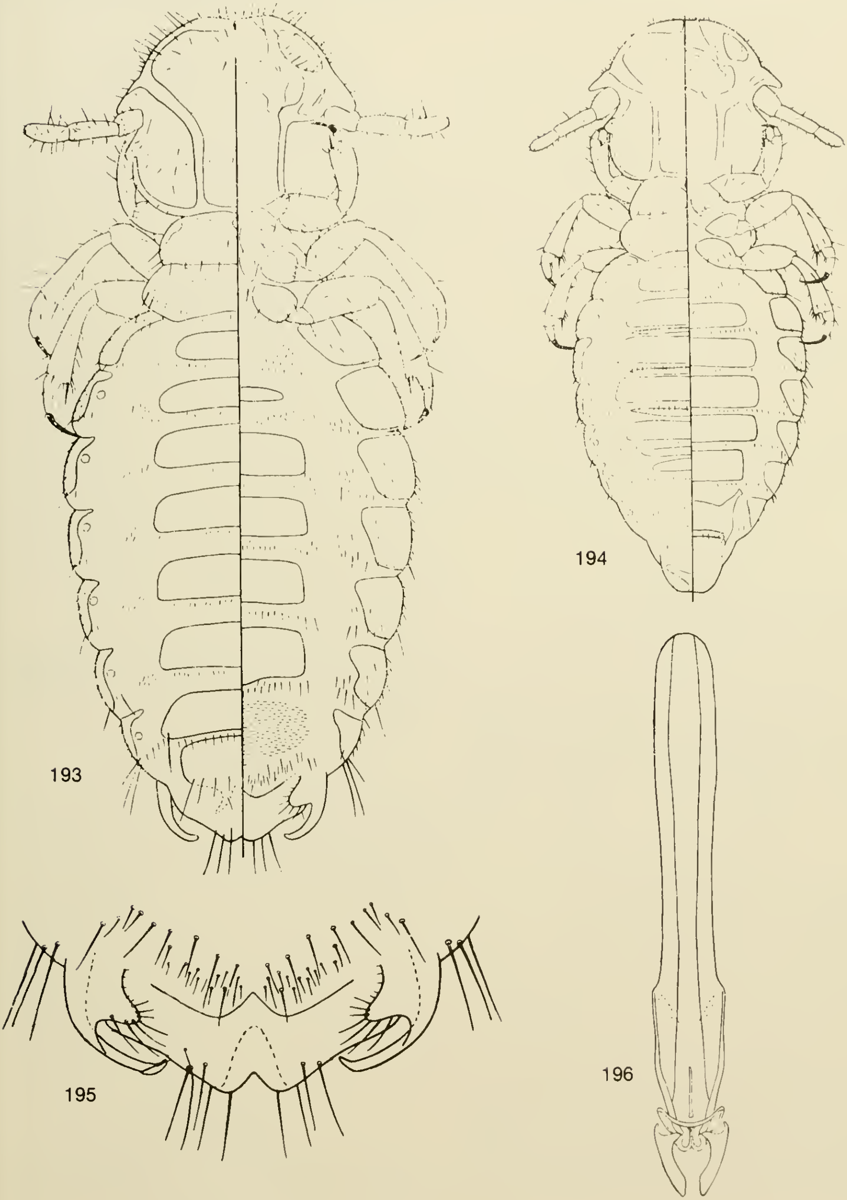


Fig. 193-196. *Bovicola caprae* (Gurlt), from *Capra hircus.* From Werneck, 1936: 193, dorsal-ventral view of female; 194, dorsal-ventral view of male; 195, ventral view of female terminalia; 196, male genitalia.



Trichodectes solidus Rudow, 1866:112, Pl. 7, Fig. 2.
Trichodectes peregrinus Taschenberg, 1882: 218, Pl. 7, Fig. 10.
Trichodectes climax truncata Kellogg, 1908:6.

Found worldwide on domestic short-haired goats, the holotype was taken off *Capra hirca* Linnaeus in Europe. The fact that Werneck (1950) recorded its presence in Guyana, Brazil, Argentina, and Colómbia in South America supports the assumption that it also occurs in Venezuela, even though it has not been reported there.

Bovicola bovis (Linnaeus)
(Fig. 197-198)

Pediculus bovis Linnaeus, 1758:611.
Pediculus tauri Olfers, 1816:85.
Trichodectes scalaris Nitzsch, 1818:296.

Found worldwide on domestic cattle, the holotype was taken off *Bos taurus* Linnaeus in Europe. In 1950 Werneck recorded it from Brazil, and the species seems likely to occur also in Venezuela, although it has not been reported there.

Bovicola ovis (Linnaeus)
(Fig. 199-202)

Pediculus ovis Linnaeus, 1758:611.
Pediculus ovisarietis Schrank, 1803:187.
Pediculus sphaerocephalus Olfers, 1816:85.

The holotype was taken off domestic sheep (*Ovis aries* Linnaeus) in Europe. The species is found worldwide on domestic sheep. Werneck (1950) recorded it from Brazil, and it probably occurs in Venezuela, although there are no records of it there.

Bovicola equi (Linnaeus)
(Fig. 203-206)

Pediculus equi Linnaeus, 1758:611.
Trichodectes caballi Denny, 1852:30.
Trichodectes pilosus Giebel, 1874:59.
Trichodectes parumpilosus Piaget, 1880:397, Pl. 32, Fig. 5.
Trichodectes vestitus Railliet, 1895:835, Fig. 576.
Trichodectes pubescens Neumann, 1905:61.

The holotype was collected off a domestic horse *Equus caballus* Linnaeus in Europe. It is found worldwide on domestic horses. Werneck (1950) recorded it from horses in the **Distrito Federal, Rio de Janeiro, Minas Gerais, São Paulo** and **Rio Grande do Sul**, Brazil. He also recorded it from mules in **São Paulo**, and **Rio Grande do Sul**, Brazil. The species probably occurs in Venezuela, although it has not been reported there.

Genus *Tricholipeurus* Bedford

Tricholipeurus Bedford, 1929:514. Type-species: *Tricholipeurus aepycerus* Bedford, 1929.

Tricholipeurus albimarginatus (Werneck)
(Fig. 207-210)

Trichodectes albimarginatus Werneck, 1936: 570, Fig. 205-212.

The holotype was collected at Pullus, Rio Aripuana, T.F. **Amazonas**, Brazil, off *Mazama americana* (Erxleben). Werneck (1950) recorded it off: the type-host collected at Cananea, **São Paulo**, Brazil; *Mazama rondoni* Miranda (= *M. gouazoubira* G. Fischer) collected at Madeira, T.F. **Amazonas**, and in the state of **Mato Grosso**, Brazil; *Mazama nemorivaga* F. Cuvier (= *M. gouazoubira* G. Fischer) collected at **Jujuy**, Argentina; *Mazama tema* Rafinesque (= *M. americana* Erxleben) collected at Nova Teutonia and Santa Catarina, Brazil; and *Mazama* sp. collected at Yacuiba, Bolivia; Rio Paraná, **Mato Grosso**; and Tabatinguera and Itapura, **São Paulo** in Brazil.

Venezuelan Records

Two females and one male were collected near Caracas, **Distrito Federal**. Unfortunately, there was no record of the host, but it was likely a species of *Mazama*.

Tricholipeurus lipeuroides (Megnin)
(Fig. 211-214)

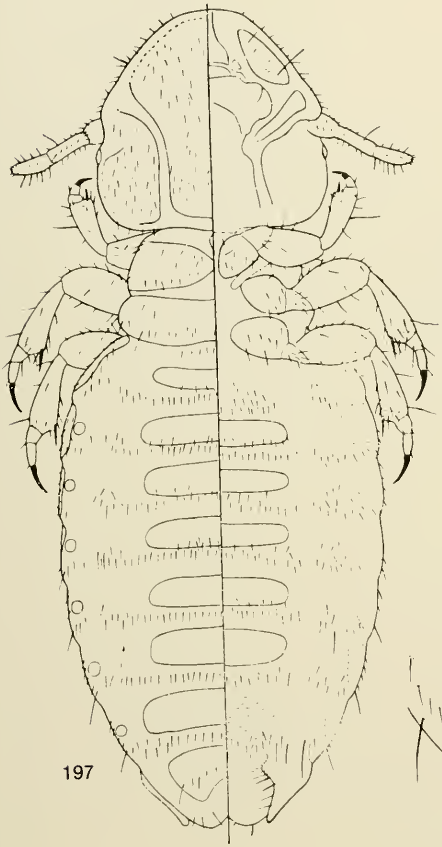
Trichodectes lipeuroides Megnin, 1884:494.
Eutrichophilus mexicanus Mjöberg, 1910:79 and 244; Fig. 49, 50, and 137; Pl. 4, Fig. 1-2.
Eutrichophilus mazama Stobbe, 1913:562.
Trichodectes virginianus Peters, 1930:76, Fig. 1-3.

The holotype was collected off *Odocoileus virginianus mexicanus* (Gmelin) in México. The species is common on *O. virginianus* (Zimmermann) in North America, and, although it has not been recorded, it probably occurs on that host in Venezuela as well.

Tricholipeurus parallelus (Osborn)
(Fig. 215-218)

Trichodectes parallelus Osborn, 1896:240, Fig. 148.

Fig. 197-198. *Bovicola bovis* (Linnaeus), from *Bos taurus*. From Werneck, 1936:197, dorsal-ventral view of female; 198, ventral view of female terminalia.



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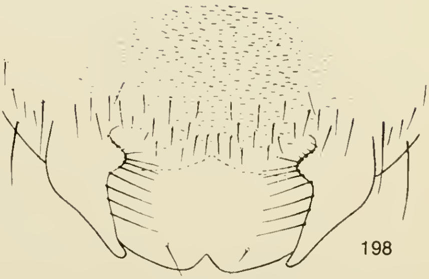


198

Fig. 199-202. *Bovicola ovis* (Linnaeus), from *Ovis aries*. From Werneck, 1936:199, dorsal-ventral view of female; 200, dorsal-ventral view of male; 201, ventral view of female terminalia; 202, male genitalia.

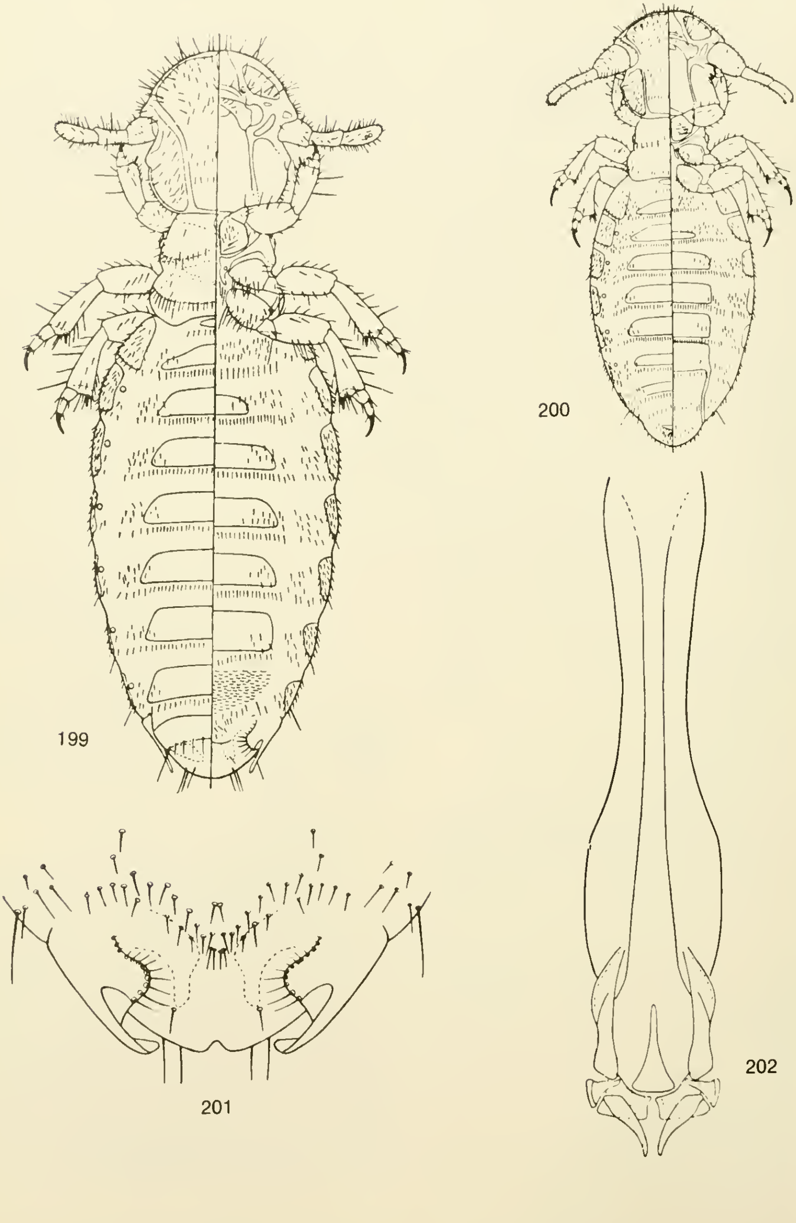


Fig. 203-206. *Bovicola equi* (Linnaeus), from *Equus caballus*. From Werneck, 1936: 203, dorsal-ventral view of female; 204, dorsal-ventral view of male; 205, ventral view of female terminalia; 206, male genitalia.

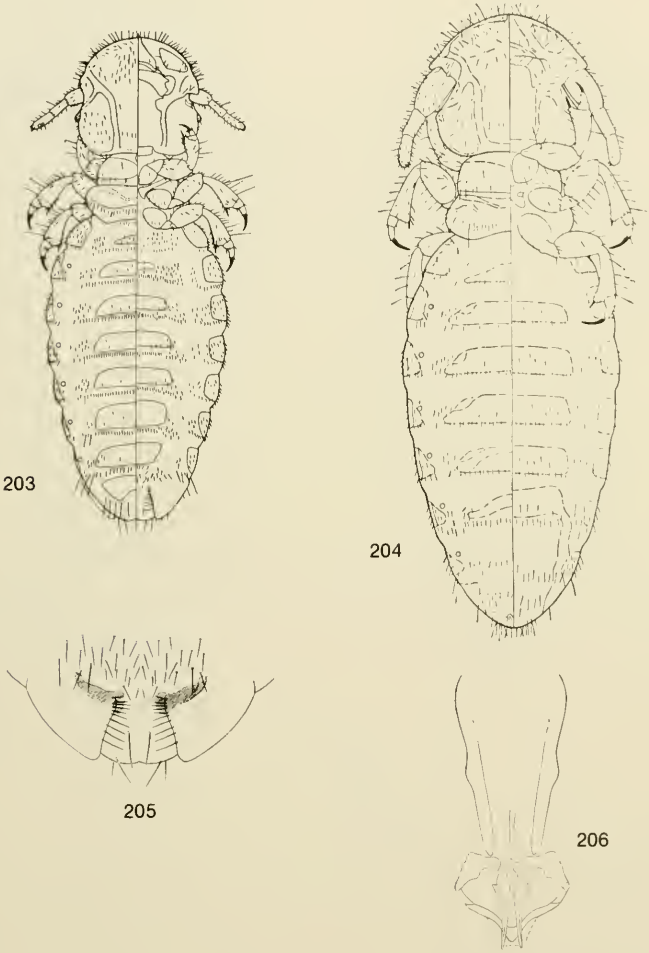


Fig. 207-210. *Tricholipeurus albimarginatus* Werneck, from *Mazama* sp., Distrito Federal: 207, dorsal-ventral view of female; 208, dorsal-ventral view of male; 209, ventral view of female terminalia; 210, male genitalia.

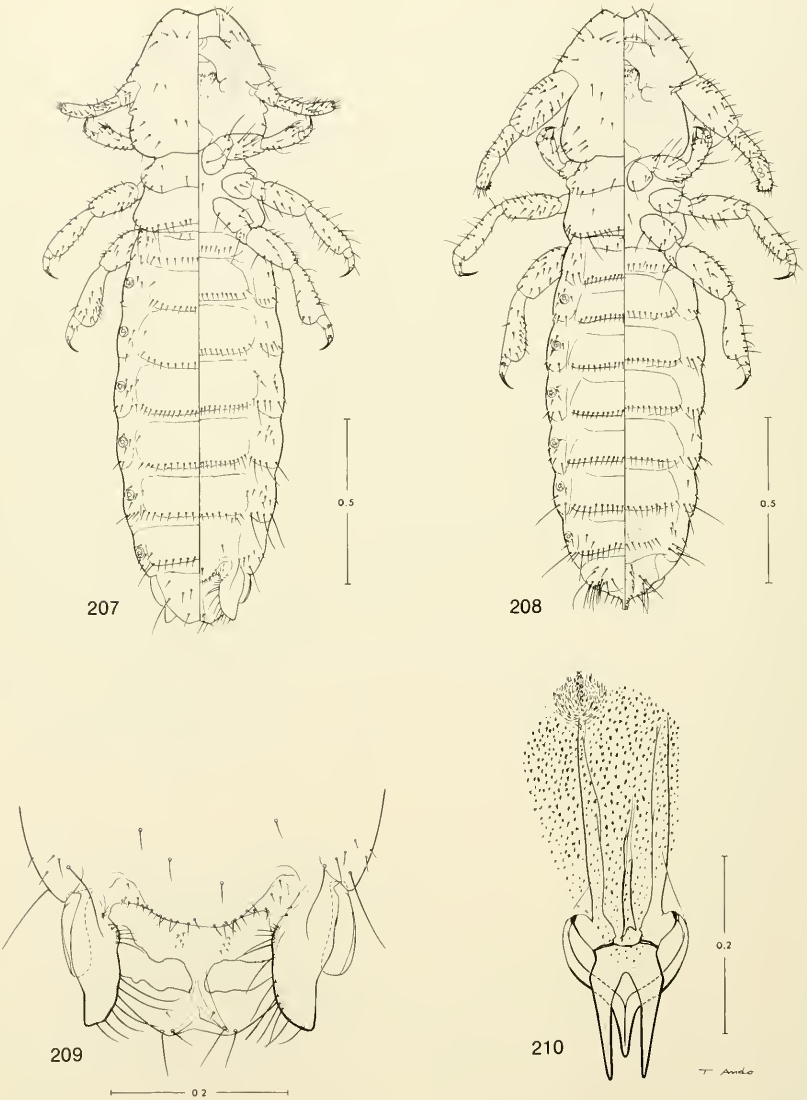


Fig. 211-214. *Tricholipeurus lipeuroides* (Megnin), from *Odocoileus virginianus.* From Werneck, 1950: 211, dorsal-ventral view of female; 212, dorsal-ventral view of male; 213, ventral view of female terminalia; 214, male genitalia.

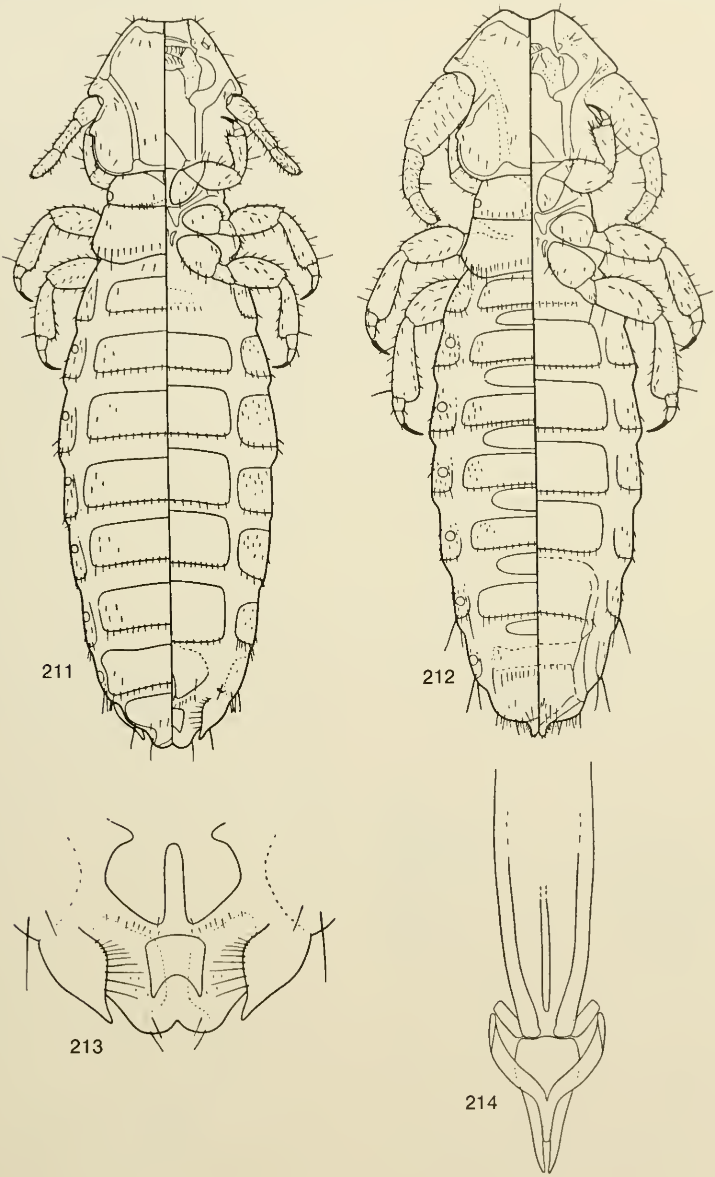
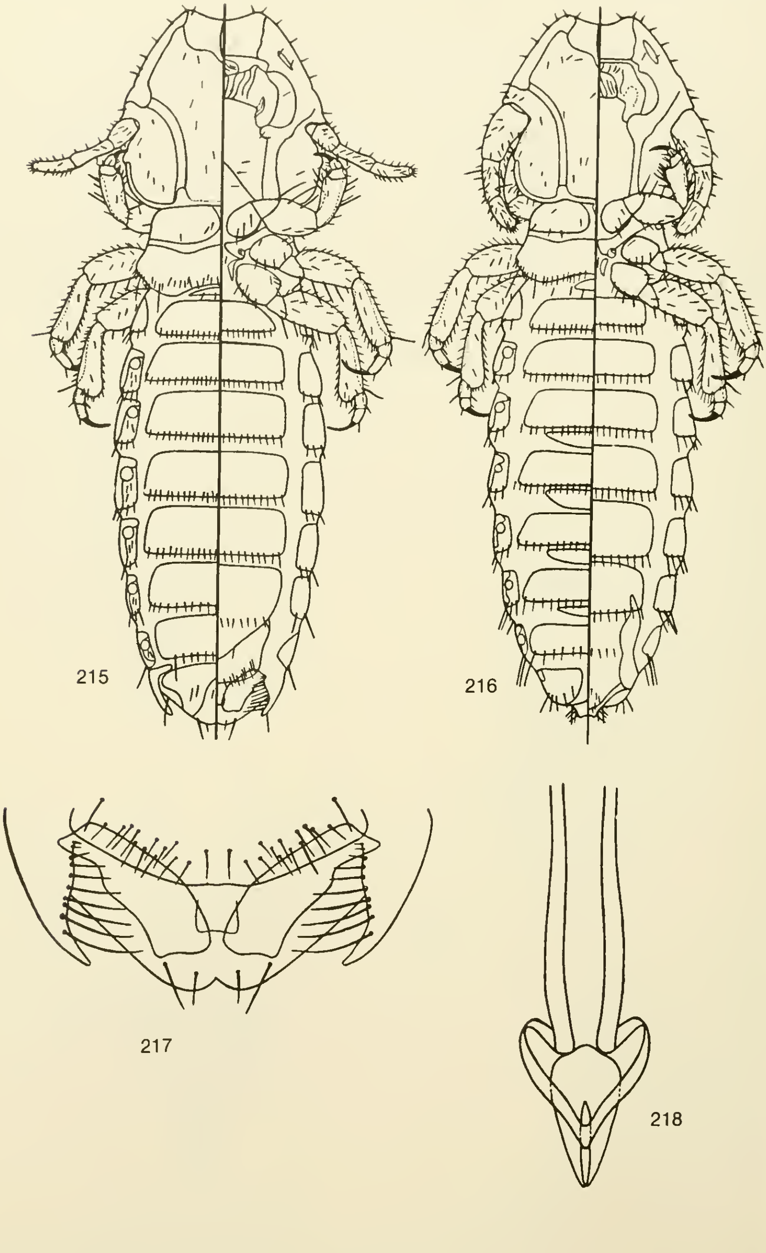


Fig. 215-218. *Tricholipeurus parallelus* (Osborn), from *Odocoileus virginianus*. From Werneck, 1950: 215, dorsal-ventral view of female; 216, dorsal-ventral view of male; 217, ventral view of female terminalia; 218, male genitalia.



Trichodectes odocoilei McGregor, 1917:173, Pl. 17, Fig. 7.

The holotype was taken off *Odocoileus virginianus* (Zimmermann) at Ithaca, New York. It is a common parasite on this host in North America and although it has not been found in Venezuela it probably occurs there.

HOST-PARASITE RELATIONSHIPS

Mallophaga are obligatory external parasites and are usually host-specific; therefore, their distribution is dependent entirely upon distribution of the hosts. The exterior surface of the host provides an obligatory parasite a much more stable environment than the one in which the host lives. Some species of Mallophaga are restricted to a single host subspecies, and others are restricted to a host species, genus, or closely related genera. With few exceptions, the same species of Mallophaga is found on a mammal species throughout its range without regard to host subspecies. In the New World the only exception to this host specificity is in the genus *Geomydoecus* found on pocket gophers.

Mallophaga collected by personnel of the Smithsonian Venezuela Project reported in this paper confirm the above with the exception of lice found on spiny rats (*Proechimys*), and that exception might not exist if more data were available. For some time it has been known to most specialists that taxonomy and classification of the genus *Proechimys* is unsatisfactory. The Mallophaga examined to date do not confirm any known classification of *Proechimys*, not even that material used in this study. It is apparent from the data now available that species of Mallophaga, especially those in the genus *Gliricola*, are restricted in distribution by characters in the host genus *Proechimys* yet undetected by mammalogists. The data are not adequate to determine whether the host is undergoing divergent or convergent evolution. There is no doubt from the parasite data available that one of these two is occurring, probably influenced to a great extent by the habitats found at different elevations.

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THE STREBLID BATFLIES OF VENEZUELA (DIPTERA: STREBLIDAE)

by

Rupert L. Wenzel

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TABLE OF CONTENTS

- ABSTRACT 1
- INTRODUCTION 1
- MATERIAL STUDIED 2
- DEPOSITION OF MATERIAL 2
- MORPHOLOGY AND TERMINOLOGY 4
- TAXONOMIC POSITION OF STREBLIDAE 7
- SYSTEMATICS 11
  - Key to the Genera of New World Streblidae 12
  - Subfamily Nycterophiliinae 14
    - Key to Venezuelan Species of Nycterophiliinae 14
    - *Phalcophila*, new genus 15
      - *Phalcophila puliciformis*, new species 16
    - Genus *Nycterophilia* Ferris 20
      - *Nycterophilia coxata* Ferris 20
      - *Nycterophilia fairchildi* Wenzel 22
      - *Nycterophilia mormoopsis*, new species 22
      - *Nycterophilia natali* Wenzel 24
      - *Nycterophilia parnelli* Wenzel 24
  - Subfamily Trichobiinae 25
    - Genus Trichobius Gervais 25
    - Key to Venezuelan Species of *Trichobius* 26
      - *Trichobius pallidus* group 32
        - *Trichobius pallidus* (Curran) 32
      - *Trichobius caecus* group 32
        - *Trichobius caecus* Edwards 32
        - *Trichobius johnsonae* Wenzel 34
        - *Trichobius bilobus*, new species 34
        - *Trichobius galei* Wenzel 36
      - *Trichobius major* group 38
        - *Trichobius sparsus* Kessel 38
        - *Trichobius parasparsus*, new species 40
        - *Trichobius sphaeronotus* Jobling 42
        - *Trichobius leionotus*, new species 43
        - *Trichobius longipilis*, new species 44
      - *Trichobius uniformis* group 45
        - *Trichobius keenani* Wenzel 46
        - *Trichobius lionycteridis* Wenzel 46
        - *Trichobius lonchophyllae* Wenzel 47
        - *Trichobius uniformis* Curran 47
      - *Trichobius dugesii* group 48
        - *Trichobius dugesii* complex 49
        - *Trichobius dugesii* Townsend 49
        - *Trichobius propinquus*, new species 52
        - *Trichobius joblingi* Wenzel 54
        - *Trichobius persimilis*, new species 56
        - *Trichobius macrophylli* Wenzel 57
        - *Trichobius handleyi*, new species 57
        - *Trichobius urodermae* Wenzel 60
        - *Trichobius tiptoni*, new species 60
        - *Trichobius angulatus*, new species 62
        - *Trichobius assimilis*, new species 62
        - *Trichobius* sp. 63
        - *Trichobius parasiticus* complex 63
        - *Trichobius dugesioides* Wenzel 63
        - *Trichobius tuttlei*, new species 64
        - *Trichobius ethophallus*, new species 65
        - *Trichobius flagellatus*, new species 67
        - *Trichobius diphyllae* Wenzel 68
        - *Trichobius diaemi*, new species 68
        - *Trichobius parasiticus* Gervais 69
      - *Trichobius longipes* group 69
        - *Trichobius costalimai* Guimarães 69
        - *Trichobius longipes* Rudow 72
        - *Trichobius silvicolae*, new species 73
        - *Trichobius affinis*, new species 73
        - *Trichobius strictisternus*, new species 74
      - *Trichobius dunni* group 74
        - *Trichobius imitator*, new species 74
        - *Trichobius jubatus*, new species 76
      - *Trichobius phyllostomae* group 77
        - *Trichobius vampyropis* Wenzel 77
        - *Trichobius petersoni*, new species 78
        - *Trichobius hispidus*, new species 80
      - *Xenotrichobius*, new genus 81
        - *Xenotrichobius noctilionis*, new species 82
    - Genus *Anatrichobius* Wenzel 83
      - *Anatrichobius scorzai* Wenzel 83
    - Genus *Trichobioides* Wenzel 86
      - *Trichobioides perspicillatus* (Pessôa & Galvão) 86
    - Genus *Paratrichobius* Lima 86
    - Provisional Key to the Venezuelan Species of *Paratrichobius* 86
      - *Paratrichobius lowei* Wenzel 87
      - *Paratrichobius sanchezi* Wenzel 87
      - *Paratrichobius dunni* (Curran) 87
      - *Paratrichobius salvini* Wenzel 89
      - *Paratrichobius* species (*salvini* complex) 89
      - *Paratrichobius longicrus* (Ribeiro) 89
      - *Paratrichobius* species (*longicrus* complex) 92
    - Genus *Neotrichobius* Wenzel & Aitken 92
    - Key to the Species of *Neotrichobius* 93
      - *Neotrichobius stenopterus* Wenzel & Aitken 93
      - *Neotrichobius bisetosus*, new species 93
      - *Neotrichobius delicatus* (Machado-Allison) 95
      - *Neotrichobius* species (*delicatus* complex) 96
      - *Neotrichobius ectophyllae*, new species 97
    - Genus *Megistopoda* Macquart 98
      - *Megistopoda aranea* (Coquillett) 98
      - *Megistopoda proxima* (Séguy) 99
    - Genus *Mastoptera* Wenzel 99
    - Key to Described Species of *Mastoptera* 99
      - *Mastoptera guimaraesi* Wenzel 100
      - *Mastoptera minuta* (Lima) 100
      - *Mastoptera* species (*minuta* complex) 102
    - Genus *Aspidoptera* Coquillett 103
    - Key to Species of *Aspidoptera* 103
      - *Aspidoptera delatorrei* Wenzel 104
      - *Aspidoptera falcata*, new species 104
      - *Aspidoptera phyllostomatis* (Perty) 107
    - Genus *Exastinion* Wenzel 108
    - Key to the Species of *Exastinion* 108
      - *Exastinion clovisi* (Pessôa & Guimarães) 108
      - *Exastinion oculatum*, new species 110
      - *Exastinion deceptivum*, new species 112
    - Genus *Noctiliostrebla* Wenzel 112
    - Key to Venezuelan Species of *Noctiliostrebla* 113
      - *Noctiliostrebla dubia* (Rudow) 113
      - *Noctiliostrebla traubi* Wenzel 115
      - *Noctiliostrebla maai* Wenzel 115
      - *Noctiliostrebla aitkeni* Wenzel 117

Genus *Paradyschiria* Speiser 117
Key to the Known Species of *Paradyschiria* 117
- *Paradyschiria parvula* Falcoz 118
- *Paradyschiria parvuloides* Wenzel 119
- *Paradyschiria curvata*, new species 119
- *Paradyschiria fusca* Speiser 121
- *Paradyschiria lineata* Kessel 123

Genus *Speiseria* Kessel 123
Key to Species of *Speiseria* 124
- *Speiseria ambigua* Kessel 125
- *Speiseria peytoni*, new species 127
- *Speiseria magnioculus*, new species 129

Genus *Parastrebla* Wenzel 129
- *Parastrebla handleyi* Wenzel 129

Genus *Pseudostrebla* Lima 130
Key to the Species of *Pseudostrebla* 130
- *Pseudostrebla sparsisetis*, new species 130
- *Pseudostrebla greenwelli* Wenzel 132
- *Pseudostrebla ribeiroi* Lima 132

Genus *Stizostrebla* Jobling 132
- *Stizostrebla longirostris* Jobling 132

Genus *Strebla* Wiedemann 132
Key to the Species of *Strebla* 135
- *Strebla altmani* Wenzel 138
- *Strebla alvarezi* Wenzel 141
- *Strebla asternalis*, new species 141
- *Strebla christinae* Wenzel 142
- *Strebla chrotopteri*, new species 144
- *Strebla consocia* Wenzel (*emendation*) 146
- *Strebla cormurae*, new species 148
- *Strebla curvata*, new species 148
- *Strebla diaemi* Wenzel 151
- *Strebla diphyllae* Wenzel 151
- *Strebla galindoi* Wenzel 151
- *Strebla guajiro* (Garcia & Casal) 151
- *Strebla harderi*, new species 152
- *Strebla hertigi* Wenzel 153
- *Strebla kohlsi* Wenzel 154
- *Strebla machadoi* Wenzel 154
- *Strebla matsoni*, new species 154
- *Strebla mirabilis* (Waterhouse) 155
- *Strebla obtusa*, new species 156
- *Strebla paramirabilis*, new species 158
- *Strebla proxima*, new species 158
- *Strebla tonatiae* (Kessel) 160
- *Strebla wiedemanni* Kolenati 160

Genus *Paraeuctenodes* Pessôa & Guimarães 162
Key to Species of *Paraeuctenodes* 162
- *Paraeuctenodes longipes* Pessôa & Guimarães 162
- *Paraeuctenodes similis*, new species 164

Genus *Anastrebla* Wenzel 164
Key to the Species of *Anastrebla* 165
- *Anastrebla modestini* Wenzel 165
- *Anastrebla mattadeni* Wenzel 166
- *Anastrebla caudiferae*, new species 166
- *Anastrebla nycteridis* Wenzel 167
- *Anastrebla spurrelli*, new species 168

Genus *Metelasmus* Coquillett 168
- *Metelasmus* sp. 169
- *Metelasmus pseudopterus* Coquillett 169

ACKNOWLEDGMENTS 169
HOST-PARASITE LIST 171
LITERATURE CITED 175

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by

Rupert L. Wenzel[1]

ABSTRACT

This study was based on more than 36,000 Venezuelan Streblidae representing ca. 115 species and species complexes in 22 genera, taken from more than 6,800 bats of 95 species. Two new genera are proposed and 45 new species are described. The morphology is briefly discussed and terminology is revised. Collection data are given for each species, together with discussions on variability and host relationships when pertinent. Keys to genera and species are included, as well as illustrations of most species. *Noctiliostrebla dubia* (Rudow) and the male of *Parastrebla handleyi* Wenzel are characterized, and relationships of *Speiseria* are discussed. New Taxa—*Anastrebla caudiferae* n. sp., *Anastrebla spurrelli* n. sp.; *Aspidoptera falcata* n. sp.; *Exastinion deceptivum* n. sp., *Exastinion oculatum* n. sp.; *Neotrichobius bisetosus* n. sp., *Neotrichobius ectophyllae* n. sp.; *Nycterophilia mormoopsis* n. sp.; *Paradyschiria curvata* n. sp.; *Paraeuctenodes similis* n. sp.; *Phalcophila*, new genus (type species: *Phalcophila puliciformis* n. sp.); *Pseudostrebla sparsisetis* n. sp.; *Speiseria magnioculus* n. sp., *Speiseria peytoni* n. sp.; *Strebla asternalis* n. sp., *Strebla chrotopteri* n. sp., *Strebla cormurae* n. sp., *Strebla curvata* n. sp., *Strebla harderi* n. sp., *Strebla matsoni* n. sp., *Strebla obtusa* n. sp., *Strebla paramirabilis* n. sp., *Strebla proxima* n. sp.; *Trichobius affinis* n. sp., *Trichobius angulatus* n. sp., *Trichobius assimilis* n. sp., *Trichobius bilobus* n. sp., *Trichobius diaemi* n. sp., *Trichobius ethophallus* n. sp., *Trichobius flagellatus* n. sp., *Trichobius handleyi* n. sp., *Trichobius hispidus* n. sp., *Trichobius imitator* n. sp., *Trichobius jubatus* n. sp., *Trichobius leionotus* n. sp., *Trichobius longipilis* n. sp., *Trichobius parasparsus* n. sp., *Trichobius persimilis* n. sp., *Trichobius petersoni* n. sp., *Trichobius propinquus* n. sp., *Trichobius silvicolae* n. sp., *Trichobius strictisternus* n. sp., *Trichobius tiptoni* n. sp., *Trichobius tuttlei* n. sp.; *Xenotrichobius*, new genus (type species: *Xenotrichobius noctilionis* n. sp.). New Synonymy—*Aspidoptera busckii* Coquillett, 1899, a syn of *Aspidoptera phyllostomatis* (Perty [*Lipoptena*], 1833); *Noctiliostrebla megastigma* (Speiser [*Lepopteryx*], 1900) a syn. of *Noctiliostrebla dubia* (Rudow [*Lipoptena*], 1871); *Strebla carolliae* Wenzel, 1966, a syn. of *Euctenodes guajiro* Garcia and Casal, 1965; *Euctenodes guarani* Garcia and Casal, 1965, a syn. of *Strebla mirabilis* (Waterhouse [*Euctenodes*], 1879); *Euctenodes tupi* Garcia and Casal, 1965, a syn. of *Strebla wiedemannii* Kolenati, 1856. Removed from Synonymy—*Neotrichobius stenopterus* Wenzel, 1966, a valid species, not a syn. of *Neotrichobius delicatus* (Machado-Allison [*Pterellipsis*], 1966). New Combination—*Strebla guajiro* (Garcia and Casal [*Euctenodes*], 1965).

INTRODUCTION

The geographic position and geological history of Venezuela have resulted in biotic diversity of uncommon interest and importance. The juxtaposition and interdigitation of biogeographic provinces (Tipton and Machado-Allison, 1972) make it a crucial area for resolving the status of numerous species and understanding their distribution. The persistence of old continental shield elements adds to biologists' fascination with this area.

For these reasons alone, unusual interest attaches to the collections of mammals and their parasites made by the field teams of the Smithsonian survey of Venezuelan parasites[2], but the extraordinarily comprehensive geographic and ecological representation of these collections, and their meticulous documentation, make them of unique importance. The broad computerized data base permits investigators—not only systematists, but ecologists and epidemiologists—to focus on problems concerning the distribution and relationship of both hosts and parasites, and to explore some of the parameters governing them, in ways that are not possible with less comprehensive samples.

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[2] For an account of the organization and objectives of the survey and of the personnel and work of the field teams, see C. O. Handley, Jr., (1976) *Mammals of the Smithsonian Venezuelan Project*, elsewhere in this volume.

This paper deals chiefly with the taxonomy of the Streblidae of Venezuela and their primary host associations. Various aspects of their ecology, biogeography, and host-parasite relationships will be discussed in more detail in a later publication.

To avoid unnecessary repetition in recording data, I have omitted the names of collectors of specimens collected by the survey teams, namely Fred P. Brown, Jr., Fred L. Harder, John O. Matson, Daniel B. and Richard B. Peacock, Norman E. Peterson, and Arden L. and Merlin D. Tuttle. These teams were under the leadership of Peterson and the Tuttles.

MATERIAL STUDIED

The collections of Streblidae made by the field teams of the Smithsonian Venezuelan Project number more than 36,000 specimens from about 6,800 host bats. This is by far the largest and most comprehensive collection of Streblidae that has been made in any major geographic or political area. In addition to this rich material, I have examined a small collection made by Dr. C. O. Handley, Jr., in 1961, at Rancho Grande (Aragua); two small collections from Dr. Carlos Machado-Allison and Dr. J. Racenis, made by themselves and colleagues of the Facultad de Ciencias, Universidad Central de Venezuela, Caracas; and miscellaneous specimens from the collections of the Field Museum, the Museum of Comparative Zoology at Harvard University, and the Smithsonian Institution.

Prior to the Smithsonian Survey, relatively few Streblidae had been recorded from Venezuela. The first was *Noctiliostrebla dubia* (described as *Lipoptena dubia* by Rudow, 1871). In later papers, Bequaert (1942) listed 11 species, Matheson (1945) described 1, Machado-Allison (1966) treated 3 (1 new), and Wenzel, Tipton, and Kiewlicz (1966) recorded 24, many of them new. Wenzel (1970) listed 60 species, but many of these records were based on the survey collection.

Two new genera and 45 new species are among the 22 genera and 115 species represented in the present collections. Only 3 known New World genera, all of them monotypic, are unrepresented. These are *Synthesiostrebla* (*amorphochili*) known only from Peru; *Eldunnia* (*breviceps*) known from Panama and Colombia; and *Joblingia* (*schmidti*) known from Panama, Costa Rica, and Guatemala. Of these, probably only *Eldunnia breviceps* occurs in Venezuela, as does its characteristic host, *Lonchophylla robusta*.

DEPOSITION OF MATERIAL

Unless otherwise indicated, the types of new species collected by the survey are deposited in U.S. National Museum of Natural History (USNM), Smithsonian Institution, Washington, D.C. Paratypes and other specimens are to be divided equally between the U.S. National Museum, the Field Museum of Natural History (FMNH), and the Institute for Tropical Zoology, Universidad Central de Venezuela, Caracas (IZUCV)[3], except that, as series permit, specimens (including paratypes) will be deposited in various other collections, including the American Museum of Natural History, New York; the Bernice P. Bishop Museum, Honolulu; the British Museum (Natural History), London; the California Academy of Sciences, San Francisco; the Canadian National Collection (CNC) at the Biosystematics Research Institute, Canada Department of Agriculture, Ottawa; Charles University (Department of Systematic Zoology), Prague; Hebrew University—Hadassah Medical School (Department of Parasitology), Jerusa-

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[3] When initials of one of these institutions are given in parentheses in relation to types or specimen records, it means that those specimens (including types) are from those collections and/or deposited in them.

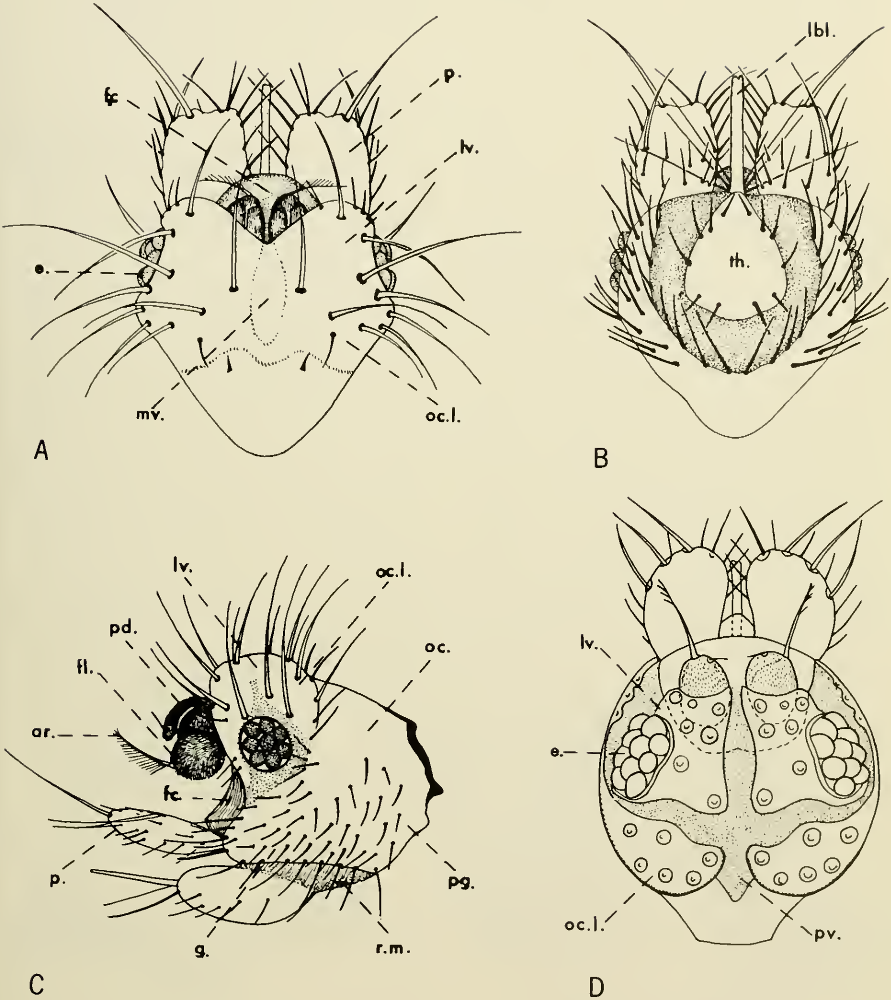


Fig. 1. Structure of head, genus *Trichobius*. A-C, *Trichobius sphaeronotus* Jobling: A, dorsal, B, ventral, and C, lateral, views of head. D, *Trichobius* sp. (*longipes* group: dorsum of head semidiagrammatic, setae omitted. A-B adapted from Zeve and Howell (1962); D adapted from Jobling (1929). See abbreviations in text.

lem; Los Angeles County Museum, Los Angeles; Museum National d'Histoire Naturelle, Paris; Museu de Zoologia, da Universidade de São Paulo; Zoologische Museum, Humboldt Universität, Berlin (Berlin Museum); Zoologisches Staatsinstitut und Zoologische Museum, Hamburg.

For type data and distribution of previously described species, see Wenzel, Tipton, and Kiewlicz (1966) and Wenzel (1970).

MORPHOLOGY AND TERMINOLOGY

To facilitate use of the descriptions and keys, the illustrations of streblid morphology and terminology that were used in *The Streblid Batflies of Panama* (Wenzel, Tipton, and Kiewlicz, 1966) are reproduced here. However, they have been altered to incorporate certain changes in terminology and interpretation that better agree with recent treatments of streblid morphology. The changes are discussed below.

Thorax. The illustrations of the thorax (Fig. 3) were adopted (Wenzel et al. 1966, Fig. 40, 41) from Zeve and Howell (1963) with somewhat changed terminology. They are somewhat inaccurate, in that they fail to show the details of the metanotum, but they do show the structures and terminology used in our taxonomic treatment. In his important paper on the thorax of Pupipara and Glossinidae, Schlein (1970, Fig. 18-20) interpreted as postnotum (*pn.*), the structure which Zeve and Howell (op. cit.) regarded as the metanotum, and as postnotal calli (*pn.c.*) the structures called tergum 3 by Zeve and Howell. I follow Schlein's interpretation. Also, I have relabeled the longitudinal and vertical membranous clefts as the notopleural suture (*np.s.*) and episternal cleft (*e.c.*), respectively, to agree with Schlein's terminology.

I have replaced the terms "sternopleura" and "pleurotrochantines" with "mesosternum" and "metasternum," respectively (= "basisternum 2" and "basisternum 3" + "furcasternum 3" of Schlein, loc. cit.), as used by Zeve and Howell (loc. cit.) and Maa (various papers).

The structure which we (Wenzel et al., 1966) called the "pleurotrochantinal lobe" is the posterior part of "furcasternum 3" of Schlein (loc. cit.). In the following descriptions, I call it the metasternal lobe (*mt.l.*). In some streblids (Fig. 4A) this ascends dorsally and even unites with epimeron 3, e.g., in the *Trichobius longipes* group, *Megastrebla parvior* Maa, and, according to Schlein (op. cit.), in some genera of Hippoboscidae.

Male Genitalia. I have also abandoned the term "gonapophyses" and substituted "postgonites," following Hennig (1971), Schlein and

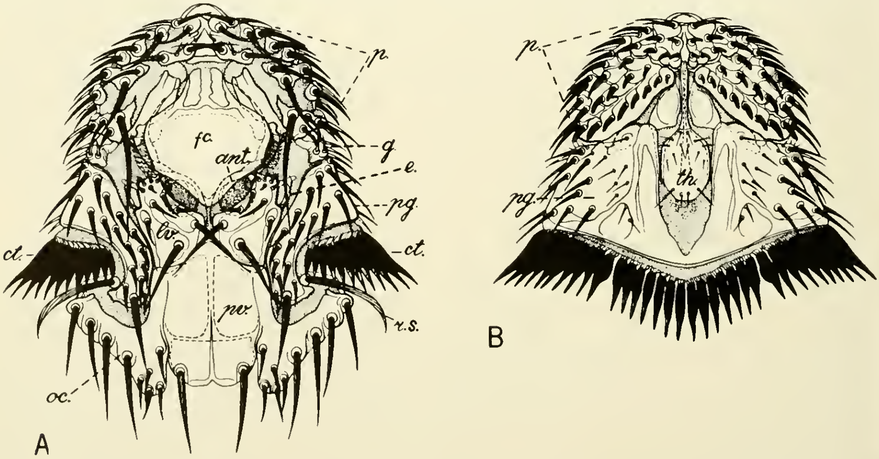


Fig. 2. Structure of head, *Metelasmus pseudopterus* Coquillett: A, dorsal, and B, ventral, views. From Jobling (1936). See abbreviations in text.

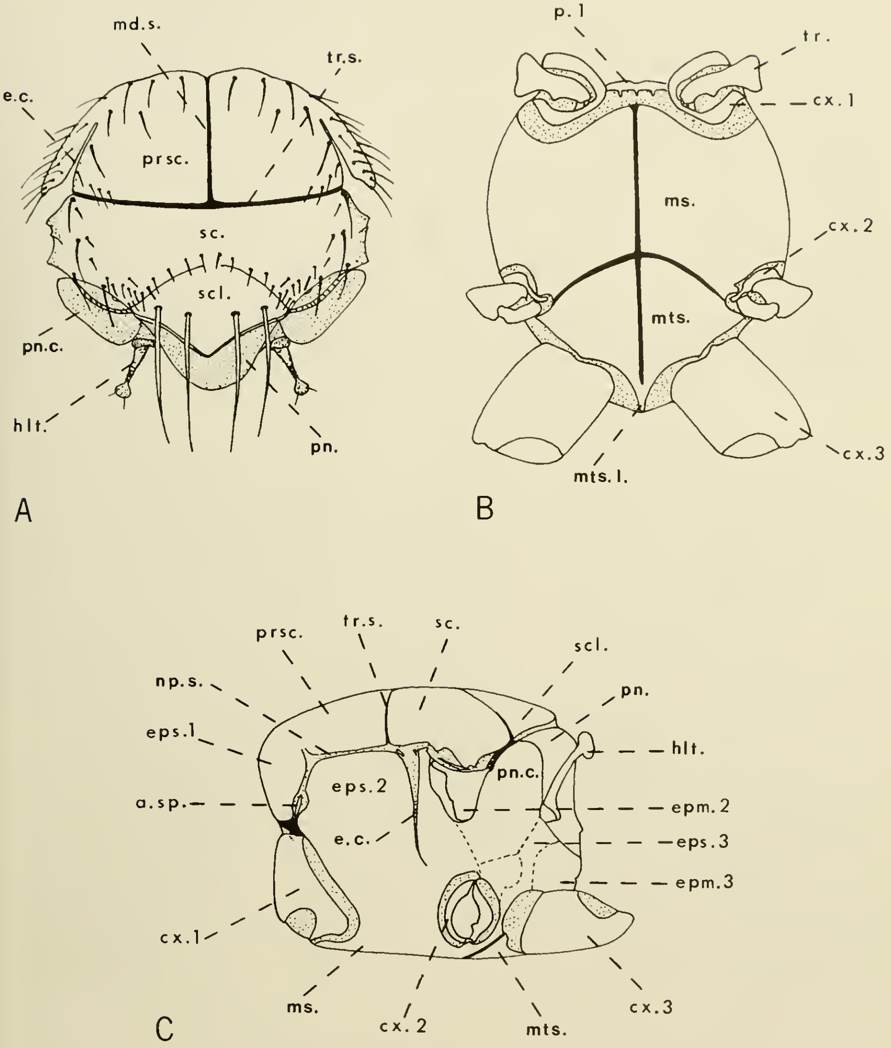


Fig. 3. Structure of thorax, semidiagrammatic, genus *Trichobius*. A, C. *Trichobius sphaeronotus* Jobling: A, dorsal, and C, lateral, views. B, *Trichobius corynorhini* Cockerell: ventral view. Adapted from Zeve and Howell (1962). See abbreviations in text.

Theodor (1971), and Griffiths (1971). I have not found any structures in New World Streblidae that are comparable to the pregonites illustrated by Schlein (loc. cit., Fig. 19c, 20) for *Brachytarsina* and *Ascodipteron.* In the illustrations, the apices of the left postgonites point to the right, and vice versa.

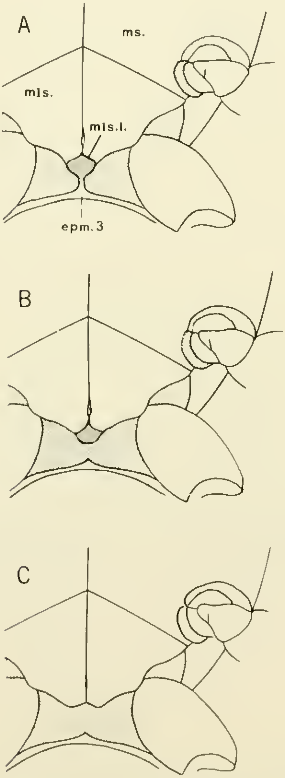
Hennig (op. cit.) and Schlein and Theodor (1971) also interpret the "clasper shafts" of the Nycterophiliinae as extensions of tergum 9, and their distal movable digits as the surstyli (*sst.*). They further interpret as hypandrium the entire structure which Wenzel et al. (op. cit.) called gonapophyses in the Nycterophiliinae. They also stated (p. 339) that "gonites and connecting rods are absent." However, though we (Wenzel, Tipton, and Kiewlicz, op. cit.) misleadingly described this entire structure as "paired," dissection shows that it is bifid distally, and the distal paired lobes carry ventral setae similar to those of the postgonites in other New World Streblidae. Thus, the entire structure appears to be hypandrium + postgonites.

Wenzel, Tipton, and Kiewlicz (1966) referred to the extraordinarily short "setae" that may be present on many sclerites (especially) as "micropile." I believe the term "microtrichia" used by Theodor (1968) is more appropriate.

Measurements (in mm)

All measurements were made with a digital binocular compound measuring microscope.

BL = body length, measured from anterior margin of frontoclypeus in Trichobiinae and Nycterophiliinae—and from apical margin of the palpi in Streblinae—to apex of proctiger in females and apex of hypopygium in males.



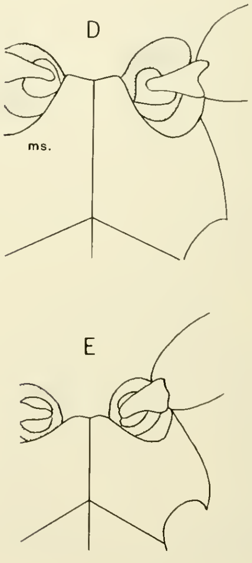


Fig. 4. A-C, posterior portion of venter of thorax showing condition in respect to posterior metasternal lobe (mts.l.): A, lobe united with metepimeron (epm. 3) as in *Trichobius longipes* (Rudow); B, lobe, short and blunt, not united with metepimeron, as in *Trichobius joblingi* Wenzel; C, lobe, absent, as in *Trichobius dugesioides* Wenzel. D-E, mesosternum: D, *Trichobius brennani* Wenzel; E, *Trichobius longipes* (Rudow).

TL = thorax length, measured from most anterior point of prescutum in Trichobiinae and Nycterophiliinae—and from middle of anterior margin in Streblinae—to apex of postnotum.

FL = femur length.

WL = wing length, measured from suture (*Ra.s.*) at base of radius (*R*) opposite humeral crossvein (*H*) to apex of wing.

WW = wing width, measured across greatest width.

List of Abbreviations

A	anal vein
aed.	aedeagus
aed.a.	aedeagal apodeme
an.	anus
ant.	antenna
ar.	arista
a.sp.	anterior thoracic spiracle
Bac.	basicosta
C	costa
ca.	calypteron?
ce.	cercus
cl.sh.	clasper shaft
conn.	abdominal connexivum
c.s.	coxal spur
ct.	ctenidium
cu	cubitus
cx.1	procoxa
cx.2	mesocoxa
cx.3	metacoxa
d.c.s.	paired dorsal connexival setae
e.	eye
e.c.	episternal cleft
epm.2	mesepimeron
epm.3	metepimeron
eps.1	proepisternum
eps.2	mesepisternum
eps.3	metepisternum
e.s.	epi-anal sclerite
fc.	frontoclypeus
fl.	flagellum
g.	gena
gon.	postgonite
H	humeral vein
hlt.	halter
hy.	hypandrium
hy.a.	hypandrial apodeme
lbl.	labella
l.l.	lateral lobe of tergum 1+2
lv.	laterovertex
M	medius
md.s.	median mesonotal suture
metn.	metanotum
m.p.l.	median pleurotrochantinal lobe
ms.	mesosternum
mts.	metasternum
mts.l.	metasternal lobe
mv.	mediovertex
np.s.	notopleural suture
oc.	occiput
oc.l.	occipital lobe
p.	palpus (maxillary)
p.l.	pronotum
pd.	pedicel
pg.	postgena
pn.	postnotum
pn.c.	postnotal callus
pr.	proctiger
prsc.	prescutum (mesoprescutum)
pv.	postvertex
R	radius
Ra.s.	suture between Sc + R and R
R.s.	radial sector
r.m.	rostral membrane
r.s.	remiform scale
sa.p.	supra-anal plate
Sc.	subcosta
sc.	scutum (mesoscutum)
scl.	scutellum (mesoscutellum)
sp.	spiracle
sst.	surstylus
st.	sternum or sternite
suba.s.	subanal sclerite
t.	tergum
t.c.	terminal cone
th.	theca
tr.	trochanter
tr.s.	transverse mesonotal suture
v.a.	ventral arc
v.a.s.	ventral accessory seta of postgonite
v.ms.	ventral macroseta of postgonite
w.p.	wing process

TAXONOMIC POSITION OF STREBLIDAE

The relationships of the Streblidae still appear to be in doubt, despite the conclusions of Hennig (1965, 1971) and Griffiths (1971). Hennig (1965) regarded the Pupipara (Hippoboscidae, Streblidae, and Nycteribiidae) as a natural group and placed them together with the Glossinidae as a family group near the Stomoxyinae in the Muscoidea. Later (1971:62 ff.), he placed them within a superfamily Glossinoidea. Griffiths (op. cit., pp. 150 ff.) treated the

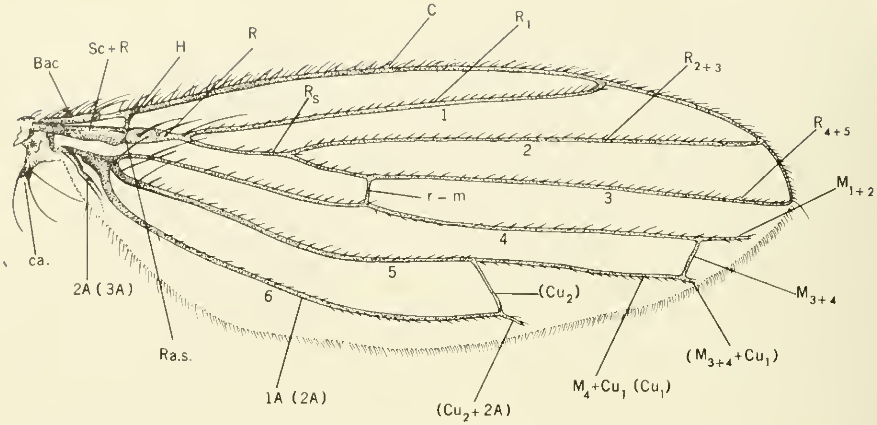


Fig. 5. Wing, *Trichobius sparsus* Kessel. Adapted from Jobling (1938). See abbreviations in text.

Pupipara and Glossinidae as a "Hippoboscidae family-group." In so doing, he reduced the Streblidae and Nycteribiidae to tribal rank within a subfamily Nycteribiidae and the Hippoboscidae to subfamily rank, all within a single family Hippoboscidae. Prefacing this treatment, and essentially quoting Hennig (1971:227), he stated that "the monophyly of the Glossinidae and Hippoboscidae, *s.l.* (or Pupipara) now seems established beyond all reasonable doubt."

Schlein (1971:369-371), on the other hand, though he agreed that the Glossinidae and Hippoboscidae are related and belong to the Calyptratae, suggested that the position of the Streblidae and Nycteribiidae should be restudied. In his opinion there is no evidence that the "conspicuous club-shaped projection on the axillary sclerite" [which Jobling (1951) interpreted as calypteron] "is homologous with the membranous calypteron of the Calyptratae." He pointed out, too, that the slit on the second segment of the antenna, regarded as "one of the main characters which defines the Calyptratae," exists also in several families of Acalypterata. In addition he noted distinctive differences in the thoracic morphology between batflies and Hippoboscidae and Glossinidae. He suggested further that similarity in genitalia between Hippoboscidae and Streblidae may be due to convergence, such as Hennig (1941) postulated between Braulidae and Nycteribiidae.

As a matter of historical interest, it should be noted that in 1941 Hennig viewed the problem differently, and Bequaert (1954) and Wenzel et al. (op. cit.) agreed with his suggestion that while Streblidae, Nycteribiidae, and Hippoboscidae may all be Calyptratae, the Hippoboscidae are not closely related to the Streblidae-Nycteribiidae. Hennig's earlier views, which they referred to and which may have been overlooked by Schlein (1971) are expressed as follows (translation from Hennig, op. cit., p. 247):

"If this [Hennig's] interpretation is to be accepted, there would be two principal groups in the Pupipara: Nycteribiidae-Streblidae and Hippoboscidae, both of which are derived from the Calyptratae, to be sure, but possibly from different roots within the group."

I am not able to critically evaluate Griffiths's (1971) extensive discussion of the male postabdomen and classification of the Cyclorrhapha. However, I do question his treatment of the Nycteribiidae and Streblidae as regards their taxonomic ranking and placement within the Hippoboscidae. He stated (op. cit., p. 150) "the further subdivision of the batfly families into Nycteribiidae and Streblidae seems unwarranted, since the differentiation of these groups can hardly have preceded the early tertiary radiation of the bats (Chiroptera); a lower rank than family seems appropriate in accordance with the time criterion of ranking." It should be noted, apart from any other considerations, that Griffiths's application of the "time criterion" is probably based on a false assumption. The Chiroptera certainly underwent considerable radiation in early tertiary, but I believe, as does

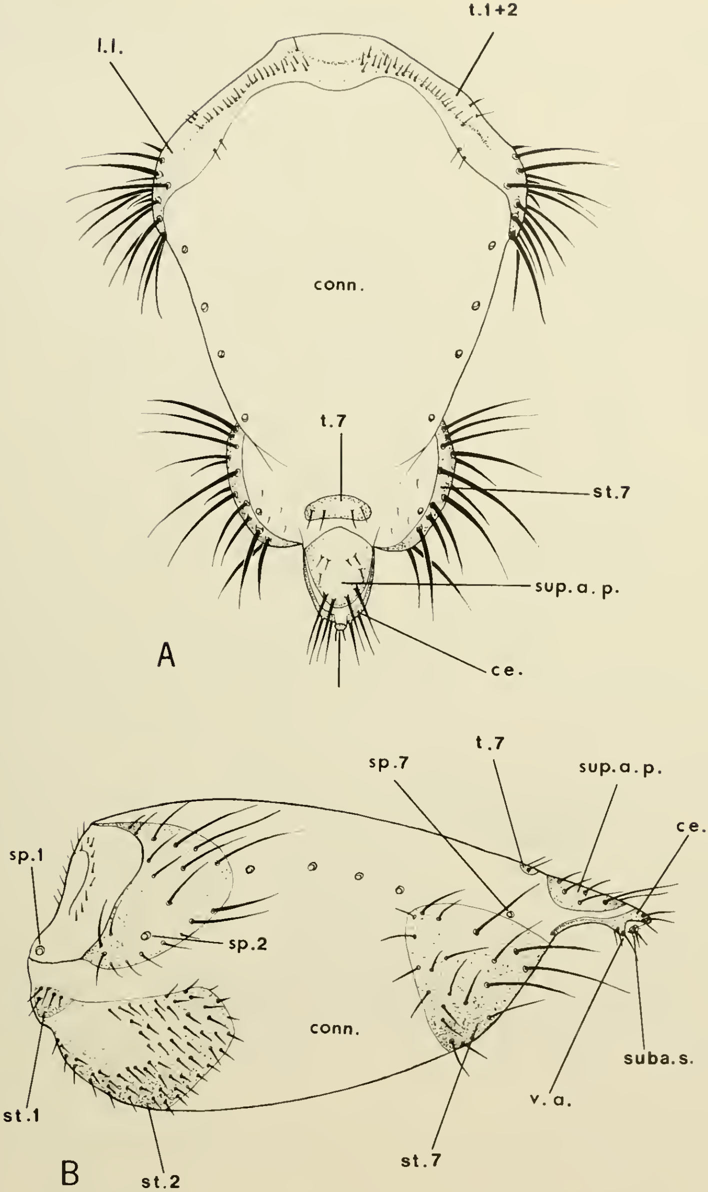


Fig. 6. Female abdomen, *Trichobius sphaeronotus* Jobling: A, dorsal, and B, lateral, views. Adapted from Zeve and Howell (1963). See abbreviations in text.

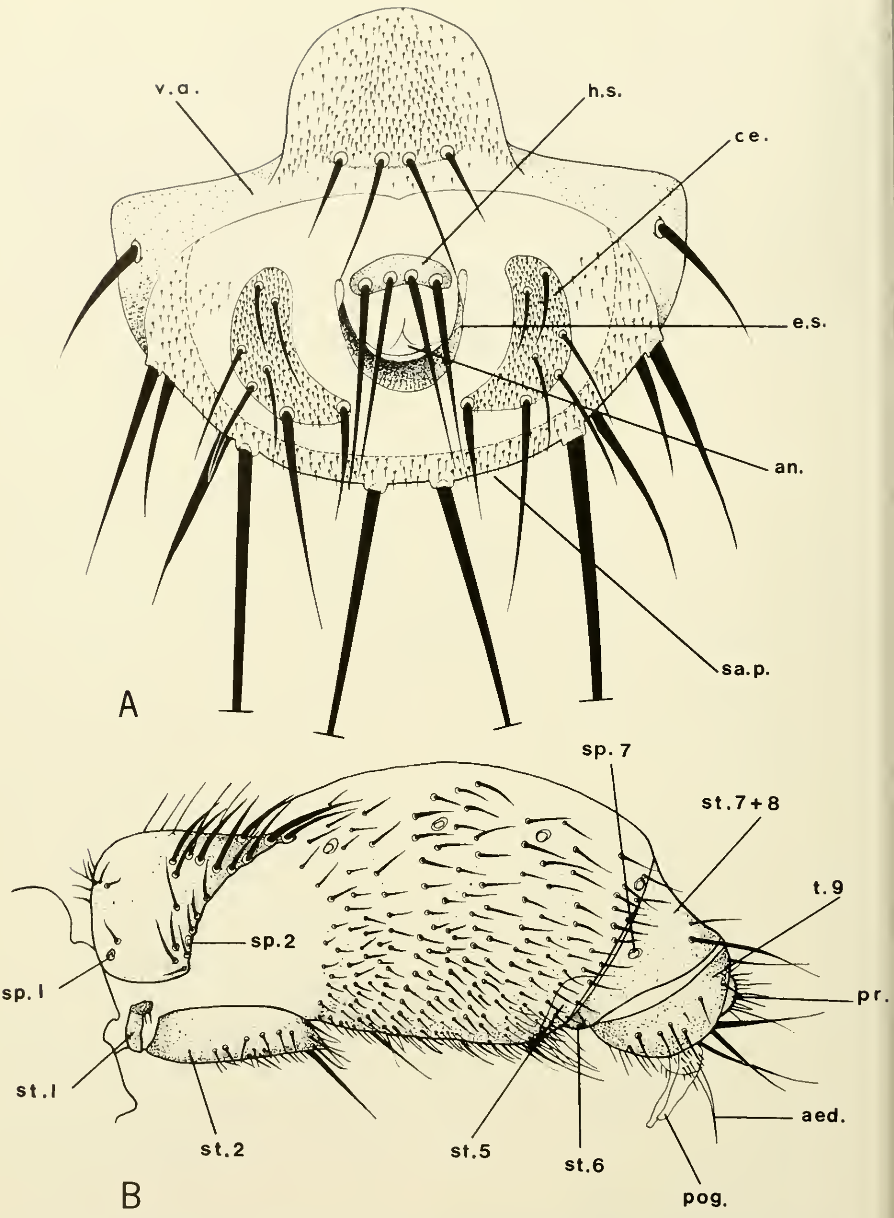


Fig. 7. A, female terminalia, ventral view: *Strebla christinae* Wenzel. B, male abdomen, lateral view, *Strebla* sp. A, from Wenzel et al. (1966); B adapted from Jobling (1951). See abbreviations in text.

Hershkovitz (pers. comm.), that continental drift best explains the present distributions of many of the higher taxa of Chiroptera. If this is so, then the Chiroptera are an ancient group whose radiation began much earlier than Griffiths believes. It should be added that the earliest known bats—from the Quercy (Eocene)—include contemporary as well as extinct taxa.

SYSTEMATICS

In the following systematic treatment, I have followed the arrangement used in Wenzel et al. (1966). In the following key, I have included the three New World genera that have not been collected in Venezuela.

For the known distribution of previously described species, see Wenzel (1970).

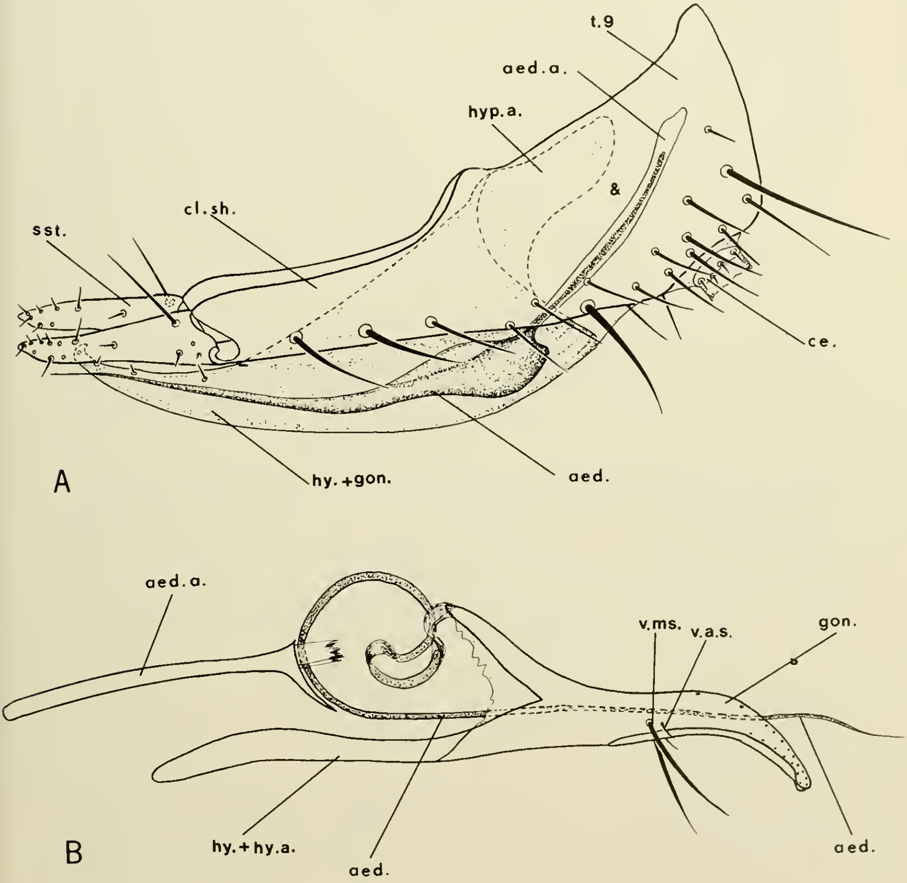


Fig. 8. Male terminalia: A, *Nycterophilia parnelli* Wenzel; B, *Strebla* sp. (U-shaped sclerites omitted). From Wenzel et al. (1966). See abbreviations in text.

Key to the Genera of New World Streblidae

1. Body strongly, laterally compressed, flealike. Wings, if fully developed, with most veins represented only by rows of setae. MALE. Preabdomen with sterna 1-6 sclerotized and distinct; genitalia (Fig. 8A) external, situated between conspicuous "claspers" (Nycterophiliinae) 2

   Body, if laterally compressed, never flealike. Wings, if fully developed, with 6 longitudinal veins (Fig. 5), sometimes reduced to oval or elongate structures, or (rarely) completely absent. MALE. Preabdomen (segments 1-6) never with sterna 3 and 4 sclerotized and distinct; 1 usually very small, sometimes reduced to a very small sclerite on each side; genitalia retracted, internal 3

2. Wings reduced to very small, apically truncate flaps. Mesonotal chaetotaxy greatly reduced, nearly absent; scutellum without setae. Hindcoxa with a large, very blunt lobe (Fig. 9B, 12A) .... *Phalcophila* n. gen.

   Wings well developed but with reduced venation. Mesonotal chaetotaxy well developed, scutellum with 2 closely appressed macrosetae. Hindcoxa with dorsoapical spur or "nipple" (Fig. 12B-1) .... *Nycterophilia* Ferris

3. Head with a ctenidium (Fig. 2) 4

   Head without a ctenidium (Fig. 1) (Trichobiinae) 8

4. Ctenidium consisting of only 18-19 spines, restricted to posteroventral part of head; palpi "free," with normal setae, not forming a broad shield for the front of the head .... *Eldunnia* Curran

   Ctenidium consisting of numerous spines, extending around sides to dorsolateral parts of head; palpi very broad, covered with numerous, heavy thornlike setae, together forming a broad shield for the front of the head (Fig. 2) (Streblinae) 5

5. Wings reduced to short pads. Dorsal connexivum of abdomen covered with setae. Prescutum with a complete median suture. Postgena, behind the ctenidium, with a remiform seta (Fig. 2A *r.s.*) .... *Metelasmus* Coquillet

   Wings normal. Dorsal connexivum of abdomen bare (but with microtrichia), except for segmentally arranged pairs of setae. Median stuture of prescutum usually short, never complete. 6

6. Hind tibiae long and slender, with numerous short setae, lacking conspicuous macrosetae on upper edge 7

   Hind tibiae with at least 2 (near apex) sometimes 6 or 8 macrosetae on upper edge, in some species as many as 12-13 setae conspicuously longer than the others, though not macrosetae .... *Strebla* Wiedemann

7. Postgenae, behind the ctenidium, each with a laterally directed remiform scale, as in *Metelasmus*, but broader .... *Anastrebla* Wenzel

   Postgena without a remiform scale .... *Paraeuctenodes* Pessôa and Guimarães

8. Wings normally developed and functional 17

   Wings much reduced or absent 9

9. Wings absent.[4] Scutum membranous excepting a short sclerotized strip connecting the scutum and scutellum on each side .... *Paradyschiria* Speiser

   Wings greatly reduced, but with recognizable venation 10

10. Venter of thorax shieldlike, anterior and posterior margins broadly rounded, the anterior margin dorsally reflexed and runnerlike. Hindlegs elongated, conspicuously longer than the others 16

    Venter of thorax not thus. Hindlegs, if elongated, not conspicuously longer than the others 11

11. Median mesonotal suture extending posteriorly beyond the transverse suture to the scutellum (Fig. 39A) 15

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[4] Rarely (Wenzel, Tipton, and Kiewlicz, 1966:541) the wings of *Megistopoda aranea* may be reduced to a very minute, barely detectable flap, without veins.

Median mesonotal suture not extending posteriorly beyond the transverse suture 12

12. Median and transverse mesonotal sutures united to form an inverted Y (Fig. 44A); notopleural suture and episternal cleft closed without evidence of a suture. Laterovertices of head each with a longitudinal pigmented suture .... *Noctiliostrebla* Wenzel

Median and transverse mesonotal sutures, united to form an inverted T; notopleural suture and episternal cleft open (membranous) or, if closed, the line of fusion is marked by a heavily pigmented, rigid suture 13

13. Posterior margin of head rounded. Median mesonotal suture not bifurcate anteriorly; both notopleural suture and episternal cleft membranous 14

Head with 2 oblique flaplike occipital lobes, whose truncated posterior margins are festooned with setae (Fig. 43E). Median mesonotal suture bifurcate anteriorly; notopleural suture and episternal cleft closed, the rigid sutures heavy, pigmented .... *Exastinion* Wenzel

14. Palpi slightly longer than wide, nearly vertical. Dorsum of abdomen clothed with short setae. MALE. Sternum 5 absent; postgonites with accessory seta inserted proximal (anterior) to the macroseta .... *Aspidoptera* Coquillett

Palpi oval, nearly horizontal. Dorsum of abdomen clothed with long setae. MALE. Sternum 5 present, divided into 2 rounded sternites; postgonites with accessory seta inserted distal to the macroseta .... *Anatrichobius* Wenzel

15. Minute species, body 0.73-1.29 mm long, with short legs. Wings with indistinct venation; with a (rarely, 2) distal, setigerous, digitiform process (Fig. 39C) .... *Mastoptera* Wenzel

Large species, 3.96-5.55 mm long, with powerful, elongated legs. Wings with distinct venation, lacking a distal digitiform process .... *Joblingia* Dybas and Wenzel

16. Inner face of profemora with a row of stout spines (Fig. 36A). Mesepisternum divided into dorsal and ventral parts by a horizontal membranous cleft similar to the notopleural suture. Wings with only 2-3 longitudinal veins (Fig. 36B) .. *Neotrichobius* Wenzel

Inner face of profemora lacking stout spines; mesepisternum not divided into two parts by a membranous cleft. Wings with 4 or more longitudinal veins (Fig. 38E) .... *Megistopoda* Macquart

17. Middle of anterior margin of prescutum with 2 closely placed, sharp teeth which fit into grooves on the posterior part of the head; humeral calluses strong, flat projections which fit under posteroventral margin of head. Costal vein heavily sclerotized, wider and bearing strong setae from base to junction with R_1, beyond which it is narrower, less strongly sclerotized, and bears short setae; *r-m* near fork of R_s .... *Synthesiostrebla* Townsend

Anterior margin of prescutum often sinuate, with blunt median projections, but never with a median pair of sharp teeth. Costa usually rather uniform in width and sclerotization throughout its length, *r-m* situated some distance from fork of R_s 18

18. Fifth longitudinal wing vein terminating at and united with second crossvein in an even arc which unites with fourth longitudinal vein just before wing apex. MALE. A large, densely setose cone present on venter, projecting from near base of hypopygium and extending posteriorly beyond it (Fig. 30) .... *Xenotrichobius* n. gen.

Fifth longitudinal vein continuing beyond second crossvein to or near wing apex 19

19. Upper surface of tibae, at least the pro- and mesotibiae, with macrosetae or some setae that are conspicuously longer than the others 22

Upper margins of tibiae covered with rather uniform setae, these fairly long in a few species of *Triochobius*, but without macrosetae or scattered setae that are conspicuously longer 20

20. Inner face of profemora with a diagonal row of heavy spines (represented only by strong setae in *P. lowei*). Hindlegs elongated, the tibiae (often curved) with numerous, minute, unsclerotized transverse cracks or spots .... *Paratrichobius* Costa Lima

Inner face of profemora without strong spines, though sometimes with strong setae. Hindlegs sometimes elongated, but tibiae are straight and lack unsclerotized areas 21

21. Palpi with setae along margins only, ventral surface bare. Wing vein R_1, united with costa opposite third crossvein, both with macrosetae to this point ...... *Trichobioides* Wenzel
Ventral surface of palpi setose. Wing vein R_1 united with coastal vein at a point distinctly beyond level of third crossvein .... *Trichobius* Gervais

22. Occipital lobes produced posteriorly as broad flaps that overlap the anterolateral margins of the prescutum, this lacking a median suture and produced anteriorly as a truncate median projection which fits between the occipital flaps; genae and postgenae evenly covered with numerous, short, posteriorly directed setae of nearly uniform size .... *Stizostrebla* Jobling
Posterior margins of occipital lobes rounded, not flaplike; genae and postgenae with both long and short setae; anterior margin of prescutum sinuate, with a bilobed median projection, the median suture well developed, usually complete 23

23. Hindlegs greatly elongated, more than half again as long as the forelegs, the hind tibiae with uniform short setae except for 3-5 erect inconspicuous setae that are about twice as long as the others .... *Speiseria* Kessel
Hindlegs longer than the others but not greatly elongated; hind tibiae with scattered, very long, conspicuous macrosetae in addition to the short setae 24

24. Head distinctly broader than long, nearly as broad as thorax; occipital lobes meeting in midline. Female. Venter of abdomen without subapical blunt spines .... *Pseudostrebla* Costa Lima
Head distinctly narrower than thorax; occipital lobes separated by the narrow membranous postvertex. Female. Venter of abdomen with a transverse row of blunt spines anterior to the seventh sternites .... *Parastrebla* Wenzel

Subfamily Nycteropiliinae

Key to Venezuelan Species of Nycterophiliinae

1. Eyes absent. Micropterous, wings reduced to short, apically truncate pads. Prescutal chaetotaxy reduced to a row of weak setae along each lateral margin and a few microsetae in anterolateral angles; scutellum without setae. Metatibiae with greatly reduced chaetotaxy, consisting chiefly of microsetae; inner face lacking apical "pad" of dense microsetae (as does inner face of first tarsomere); ventroapical spurlike seta absent. *Abdomen*: Female. Sternum 2 very much larger than 1. Male. Hypandrium (+ postgonites) extending only to about midlength of surstyli (*Phalcophila*) 6
Eyes a single large facet. Wings well developed, though with reduced venation. Prescutum covered with short setae. Scutellum with a pair of long, closely placed macrosetae. Metatibiae with normal chaetotaxy, including an apical pad of dense microsetae on inner face, similar dense setae on inner face of first tarsomere; ventroapical spurlike seta present. *Abdomen*: Female. Sterna 1 and 2 subequal; 1, overall, a little larger than 2. Male. Hypandrium (+ postgonites) extending to about apices of surstyli (*Nycterophilia*) 2

2. Metacoxal spur short, nipplelike (Fig. 12D, E) 3
Metacoxal spur longer (Fig. 12B, C, F-1) 4

3. Scutum and anterolateral angles of thorax densely setose; mesepisternum with 13 or 14 discal setae (Fig. 10D). Female. Supra-anal terminal cone of abdomen with 4 macrosetae .... *fairchildi* Wenzel
Scutum less densely setose, anterolateral angles sparsely setose; mesepisternum with 5-6 discal setae (Fig. 10C). Female. Supra-anal cone with 2 macrosetae. .. *parnelli* Wenzel

4. Outer face of profemur with an isolated submedian row of setae which extends for length of femur, in addition to marginal and submarginal setae ...... *mormoopsis* n. sp.

Outer face of profemur with at least 2 or 3 rows of setae (sometimes confused and/or abbreviated) in addition to the marginals and submarginals 5

5. Female. Dorsal abdominal connexivium with 5 transverse rows of segmental setae as follows: a basal row of 6, which is continuous on each side with the lateral connexival setae, and 4 median rows of 4 setae each, which are distinctly isolated from the lateral connexival setae; these are followed by 4 shorter setae of tergite 7. Ventral margins of seventh sternites each bearing a strong seta, and 1-2 shorter ones, but not spinelets. Male. Paired dorsal connexival setae on segments 3-4 very fine, short, inconspicuous .... *coxata* Ferris

Female. Dorsal abdominal connexivum more or less uniformly covered with strong setae similar to and continuous with those along sides. Ventral margins of seventh sternites somewhat produced and bearing 3 short spinelets in addition to 1 strong, much longer seta. Male. Paired, median, dorsal connexival setae well developed, conspicuous .... *natali* Wenzel

6. Outer apical margin of metatibiae with 4 bifid setae. Male. Marginal setae of sterna 2-7 markedly shorter than those of dorsal connexivum, resembling spinelets. Female unknown. Ex *Natalus stramineus mexicanus*, Guatemala .... *Phalcophila* sp. A

Outer apical margin of metatibiae with 1 or 2 bifid setae. Male. Marginal setae of sterna 2-7 similar in appearance to those of dorsal connexivum; those adjacent to connexivum, at least, of nearly the same size 7

7. Outer margin of metatibiae apically with 1 apical bifid seta. Male. Surstyli about half as long as clasper shaft. Female. Sixth spiracles free, not enclosed by margin of tergum 7. Ex *Platalina genovensium*, Peru .... *Phalcophila* sp. B

Outer margin of metatibiae apically with 2 bifid setae. Male. Surstyli long, about ⅔ length of clasper shaft. Female. Sixth spiracles enclosed by anterior margin of tergum 7. Ex *Lonchophylla robusta*, Venezuela .... *P. puliciformis* n. sp.

Phalcophila, new genus

Type Species: *Phalcophila puliciformis*, new species

Diagnosis

With the characters of *Nycterophilia*, except as follows: *Head.* Eyes absent. *Thorax.* Prescutal chaetotaxy greatly reduced, consisting of a row of setae along each lateral margin, a few microsetae in anterolateral angles and sometimes a couple of microsetae or discs. Scutellum without setae. Mesepisternum much shorter than remainder of thorax. *Wings.* Reduced to small, apically truncate pads. *Legs.* Metatibiae with greatly reduced chaetotaxy, consisting chiefly of microsetae; ventroapical spurlike seta lacking, as is the usual elongate apical patch of microsetae on the inner face of the tibia and of the first tarsomere. *Abdomen*: Female. Tergum 7 very large, conspicuous, extending ventrally on each side about halfway to ventral margin. Sternum 2 very large, conspicuously longer than 1. Male. Hypandrium (+ postgonites) extending only to or to about midlength of surstyli rather than to apex.

Discussion

The type species, and two others which are undescribed, clearly represent a separate lineage sufficiently set apart from *Nycterophilia*, to warrant segregating them as a distinct genus.

In the key to the species of Venezuelan Nycterophiliinae, I have included two undescribed species of *Phalcophila* so as to facilitate the identification of *P. puliciformis*. Species A is represented by 3 males (FMNH) collected in Guatemala (Santa Clara, interior valley of Sierra de las Minas, ex *Natalus stramineus*) by Luis de la Torre. Species B is represented by 3 males and 2 females (MCZ) collected in Peru (Caravelí near Arequipa, ex *Platalina genovensium*) by F. W. Walker.

The large sternum 2 (relative to 1) of the females of *Phalcophila* approaches the condition found in most other Streblidae and invalidates the statement by Wenzel et al. (1966:430) that sternum 1 is larger overall than 2 in the Nycterophiliinae (in contrast to other Streblidae, in which it is much smaller).

I tentatively interpret the remarkable, large, apical, sclerotized abdominal tergal plate of the females of *Phalcophila* to be tergum 7. In *Nycterophilia* this is a small transverse median sclerite. The incorporation of the sixth spiracles into the anterior margin of this plate in *P. puliciformis* is remarkable. The female terminal cone is a well-developed sclerite and may be homologous with the supra-anal plate of other Streblidae. A comparative morphological study of the streblid abdomen is clearly in order.

Phalcophila puliciformis, new species

(Fig. 9, 12A)

The following characters separate *P. puliciformis* from other undescribed species of the genus. Outer margin of metatibiae with 2 apical bifid setae. *Abdomen.* Tergum 2 with fine, long setae along posterior margin medial to the projecting posterolateral lobe. Male. Marginal setae of sterna 2-7 similar to adjacent setae of dorsal connexivum in appearance and size, especially the more dorsal (lateral) ones, and becoming shorter but still long and relatively slender toward venter. Surstyli long, about ⅔ the length of the clasper shaft (shaftlike portion of tergum 9). Female. Anterior margin of tergum 7 (?) enclosing sixth spiracles.

Description

Head. Eyes absent. Laterovertices each with 6 setae, two of these conspicuously longer than the others; each side of head with 2 macrosetae on occipital lobes and a diagonal row of about 4 microsetae; posterolateral margin of occiput with 7 or 8 very short setae, the lower ones more conspicuous, though the dorsal ones are somewhat longer than the rest; 3 postgenal spinelets; apical margin of head, ventral to the theca, with 2 slender setae on each side; apical projection with 2 strong spinelike setae and, posterior to these, a microseta. Palpi each with 4 strong setae along apical margin, a microseta separating the upper and lower 2, an additional microseta situted posterior to this and another near middle, well removed from dorsal margin; posterior margin with 3 microsetae; upper posterior angle with 1 macroseta.

Thorax. Prescutum without setae excepting a row of about 4 along each lateral margin (the posterior 2 conspicuously stronger), and a group of 4-5 microsetae in each anterolateral angle. Scutum with 2 medially placed setae behind the transverse suture; 1 strong seta in each anterolateral angle; just medial to this 1 short, rather weak seta; and 1 strong seta posteriorly, on each side, about ⅓ from apex. Scutellum without setae. Mesepisternal disc with 3 microsetae arranged in a vertical row dorsal and posterior to the spiracle; a group of 4 short setae ventral to the spiracle; and ventral and posterior to these is a longer, more conspicuous one. Episternal cleft very prominent, its anterior margin with about 6 setae, the 2 ventral ones clearly longer; 2 additional short setae posterior to the procoxal cavity, and dorsal and anterior to the metacoxal cavity 3 others in an oblique row; ventral to these 2 groups is a longitudinal row of about 9 very conspicuous setae extending from base to apex of mesosternum; dorsal to these is a group of 3 microsetae below the procoxal cavity; 1 long macroseta present along ventroposterior margin of the vertical membranous cleft, and dorsal to this 1 macroseta, the rest of the thorax posterior to the cleft without setae.

Wings. Reduced to 2 short flaps which do not reach beyond tergum 2 of abdomen; costa strong, 2 other veins indistinct; with about 11 setae, these rather short near base, progressively longer and stronger distally, apex with a very long macroseta; a shorter preapical seta on the next vein, and an additional short seta near midlength of wing; veins largely restricted to anterior ½ or ⅔ of wing; distal margin truncate, appearing almost as though torn off.

Forelegs. Profemora very broad, subcircular; dorsal margin with 5 conspicuous strong setae of which the most distal and the proximal ones are macrosetae; intervals with 1 or 2 short setae and 2 widely spaced setae near apex, the more proximal one a microseta, the distal one, near apex, conspicuously longer but weak; outer face with a submarginal row of about 11-12 setae which begin near midlength and extend to apex; the rest of outer face with about 20-22 short setae including about 4 ventrally near base, the dorsal ones arranged in a semicircular row of about 11; inner face of profemur with a diagonal row of 3 strong, short spinelets near middle of dorsal margin; distal to these, at about apical third, 1 very strong, much longer spinelet and 1 shorter, strong spinelet; below these a transverse row of 3 microsetae; above lower margin anterior to trochanter is a very heavy spine, distal to this an even stronger, blunt spine, and distal to this a much more slender lanceolate spinelet. Tibiae distinctly triangular, outer margin with a row of about 11 setae, the distal ones microsetae, the basal ones progressively stronger and longer, the proximal 2 rather stout; outer face with about 13-14 other setae, of which one, placed medially near base, is conspicuously stronger and longer than the rest.

Midlegs. Mesofemur with 10-11 microsetae along upper margin and several much stronger, more conspicuous setae near apex; outer face with a row of 5-7 stronger setae below upper margin and distal to these 2 strong setae; ventrally above lower margin is a row of 6 or 7 setae; below these near midlength are 2 submarginal and 2 marginal setae, 1 on each side of unsclerotized notch. Outer margin of meso-

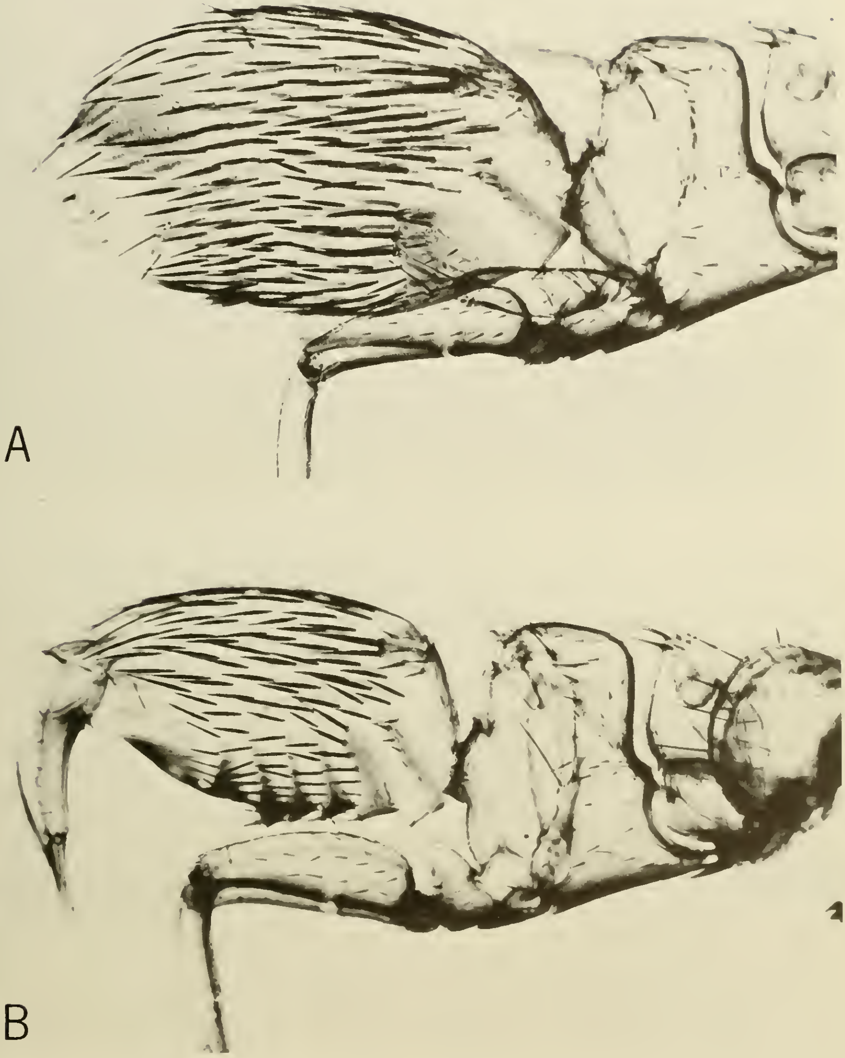

Fig. 9. *Phalcophila puliciformis*, new genus, new species, thorax and abdomen, lateral view: A, female; B, male.

tibiae with about 5 very long conspicuous setae alternating with very short ones; outer face with 18-19 bristles roughly arranged in 2 longitudinal rows; ventral margin with 7-8 very fine, short setae and a long apical seta.

Hindlegs. Metacoxa with a strong, dorsal, posteriorly projecting blunt lobe; ventrolateral half of coxa with 5-6 bristles, one of these a conspicuous spinelet; anterior to this is a microseta. Metafemora with 10-11 microsetae and 3 conspicuous long setae, two of these situated proximal to midlength and widely separated, the third situated at about apical fifth; outer face with 5-6 microsetae below dorsal margin and about 18 setae roughly arranged in 3 rows, the ventralmost row consisting of only 2 setae, the most distal seta of dorsal row long and conspicuous. Metatibiae: upper margin with about 12 microsetae (most of these so minute as to barely be detectable in slide preparations), and the characteristic pair of bifid setae near apex; outer face with a median longitudinal row of about 10-11 setae, the more proximal ones extremely minute, the distal ones becoming progressively longer, the apical seta conspicuous; ventral margin with 12-13 microsetae and, above these, 4 submarginal microsetae; apicoventral spurlike seta absent. Inner face of metatibiae with 8-9 scattered microsetae on about apical ⅔.

Abdomen: FEMALE. Tergum 1 with 5 setae on each side along sclerotized portion of posterior margin, the inner ones minute, but becoming progressively much longer and stronger laterally; anterior face of sclerotized portion with 2 well-separated setae at about midlength; median membranous portion of tergum with 2 pairs of setae, the lower pair distinctly longer. Posterolateral lobes of tergum 1+2, each with 2 very coarse subequal spinelike setae; medial to these on posterior margin are 3 other long slender setae; each posterolateral lobe also with 2 setae on lateral (lower) margin and 4 distal setae. Dorsal connexivum covered with rather coarse, long, uniformly and densely placed setae, which become more slender apicad and shorter ventrad. A very large, broad, basally emarginate, weakly sclerotized tergal plate (tergum 7 ?) covers about apical fourth of abdomen; it extends about halfway down the sides, encloses spiracle 6 on each side, just within its anterior margin, and terminates apically in a broad, rounded, shelflike projection which overhangs the cone; with very sparse long setae similar to those of the connexivum except that the distal ones are very long macrosetae; middle of apex with 2 closely placed macrosetae. Terminal cone with 2 terminal macrosetae; ventral to these on each side are 1 macroseta and 1 shorter seta. Sternum 1 very short along midline, less than half as long as sternum 2, straplike dorsally, and bearing 4 setae, the apical one strongest. Sternum 2 very long and broad, posterior margin with 3 very coarse long setae near dorsal (outer) margin on each side, and about 6 others that are similar to adjoining connexival setae; disc with 10 setae on each side, 8 of these very short and fine, the 2 dorsalmost setae conspicuously coarser. Seventh sternites small, narrowly oval, enclosing the seventh spiracles within their dorsal margin, each bearing 4 setae, 2 of these conspicuous macrosetae, the third half as long, the fourth a microseta. Apical margin of sternum 6 with about 10 setae similar to adjacent connexival setae but conspicuously longer. MALE. Setae of terga 1 and 2 similar to those of female except that the 2 heavy spinelike setae of the lateral lobes are not as coarse and the outer one is distinctly more slender than the inner. Dorsal connexivum uniformly and rather densely clothed with coarse, rather uniform setae, the apical ones conspicuously longer. Sterna 1, 3, 4, and 5 narrow and straplike dorsally; sternum 2 dorsally about twice as long as the others; sternum 6 rather broadly triangular in lateral view; sternum 1 with a longitudinal row of 7 setae, the upper 3 considerably coarser and larger than the others; marginal setae of the following sterna similar to those of the connexivum but becoming slightly more slender toward midventral line, those of sternum 2 conspicuously shorter and finer toward the midline than those above; sternum 2 with 5, sterna 3-4 with 3 submarginal or discal short setae anterior to the marginals; sterna 7 and 8 with 3 slender setae in an oblique row. "Clasper" shafts (ventral processes of tergum 9) with 5 slender setae on outer edge, the proximal one longer than the others; above these is a row of 4-5 additional slender setae along posterior margin on each side of tergum 9 and anterior to these, a macroseta; surstyli very long, nearly ⅔ the length of "clasper" shaft. Hypandrium (+ postgonites) abruptly and suddenly narrowed, almost parallel-sided in profile in about distal half, extending only to about midlength of stustyli.

MEASUREMENTS

	Males	Females
BL	1.35	1.52
TL	0.32-0.33	0.32
HFL	0.45-0.47	0.44

TYPE DATA: Male holotype (USNM) ex *Lonchophylla robusta* (SVP 23391), Venezuela,

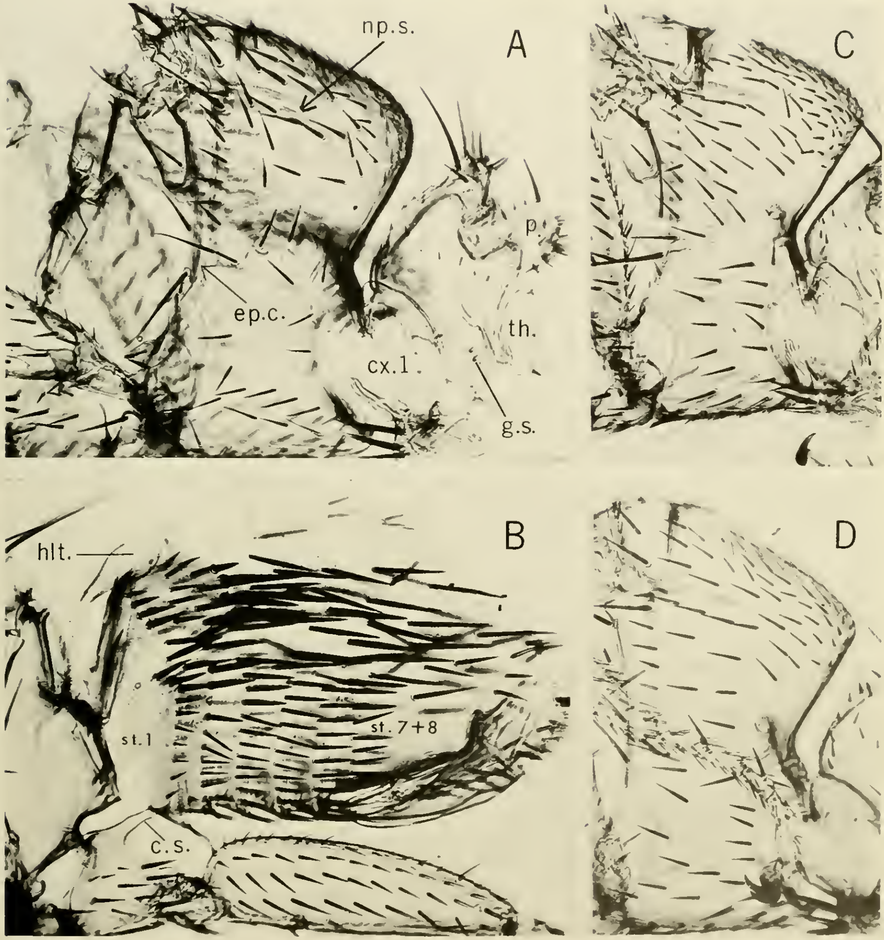

Fig. 10. A-B. *Nycterophilia natali* Wenzel: A, head and thorax, female: B, male abdomen, lateral views. C, *Nycterophilia parnelli* Wenzel: thorax, lateral view. D. *Nycterophilia fairchildi* Wenzel: thorax, lateral view. From Wenzel et al. (1966). See abbreviations in text.

Zulia, 33 km NW of La Paz, nr. Cerro Azul, 15-VI-68, N. E. Peterson and J. Matson; female allotype (USNM), same host, (SVP 34274), Barinas, Altamira, 8-I-68, A. L. Tuttle. Paratypes–1 male paratype (IZUCV), same data as the holotype, but from *Artibeus jamaicensis.*

Remarks

The male paratype from *A. jamaicensis* is probably a stray from specimens of *L. robusta* which were collected at the same time.

Genus *Nycterophilia* Ferris

Nycterophilia Ferris, 1916:436

Type Species: *Nycterophilia coxata* Ferris, 1916:437

Nycterophilia coxata Ferris

(Fig. 12F-I)

Nycterophilia coxata Ferris, 1916:437, Fig. 5, Pl. 22, Fig. 6.–Hoffmann, 1953:183, 187 (part), Pl. 3, Fig. 2.–Wenzel, Tipton, and Kiewlicz, 1966:434, Fig. 48B, 50B, 51A.

Venezuelan Survey Records (3,493 males, 3,461 females, 246 sex undet.)

BOLÍVAR: 1 male ex 1 *Phyllostomus elongatus*, 20 km W La Paragua, Hato San José, 306 m, 4-IV-67.

CARABOBO: 1 male and 3 females ex *Pteronotus parnellii*, 6 km N Urama, Urama, 60 m, 17-III-66.

DTO. FEDERAL: 6 males and 3 females ex *Pteronotus parnellii*, nr. El Limón, 48 km W Caracas, Hda. Carapiche, 380-398 m, 20-21-VIII-66.

FALCÓN: 102 males, 85 females, and 2 sex undet. ex *Pteronotus davyi*, 49 males and 48 females ex *Pteronotus parnellii*, 45 males, 51 females, and 1 sex undet. ex 17 *Mormoops megalophylla*, 8 males, 138 females, and 27 sex undet. ex *Leptonycteris curasoae*, 3 males and 3 females ex 5 *Natalus tumidirostris*, 7 km W Pueblo Nuevo, Cueva del Guano, Península de Paraguaná, 120 m, 10-31-VII-68; 2 males and 1 female ex *Pteronotus parnellii*, 16 km ENE Mirimire, nr. La Pastora, 70 m, 29-30-XI-67; 8 males and 1 female, same host, 1 male and 1 female ex 1 *Sturnira lilium*, 1 male ex 1 *Chiroderma villosum*, 19 km NW Urama, Km 40, Urama, 25 m, 18-27-X-65; 1 male ex *Glossophaga longirostris*, 15 males, 17 females, and 2 sex undet. ex *Leptonycteris curasoae*, Capatárida, 40-55 m, 21-VI–14-VII-68; 2 males and 1 female ex *Glossophaga longirostris*, 504 males, 574 females, and 17 sex undet. ex *Leptonycteris curasoae*, 25 km SW Pueblo Nuevo, Yabuquiva, Península de Paraguaná, 13 m, 17-VI–20-VII-68.

GUAJIRA: 4 males and 1 female ex *Leptonycteris curasoae*, 3 males and 2 females ex 1 *Leptonycteris* Sp. B, 37 km NNE Paraguaipoa, nr. Cojoro, 15 m, 27-28-VI-68.

GUÁRICO: 29 males and 12 females ex *Pteronotus parnellii*, 10 km NE Altagracia, Hda. El Vira, 630 m, 16-IX-66.

LARA: 39 males, 21 females, and 12 sex undet. ex *Pteronotus parnellii*, 912 males, 913 females, and 169 sex undet. ex *Leptonycteris curasoae*, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 518-528 m, 14-17-VII-68; 20 males, 26 females, and 14 sex undet., same host, 47 km NE El Tocuyo, La Concordia, El Tocuyo, 592 m, 23-24-VII-68.

MIRANDA: 3 males ex *Pteronotus parnellii*, 1 km E Río Chico, 1 m, 21-XI-66; 1 male, same host, 5 km NNW Guarenas, Curupao, 1,160 m, 6-X-66.

MONAGAS: 4 males and 1 female ex *Pteronotus parnellii*, 5 km NW Caripe, San Agustín, 1,165 m, 26-VI-67.

NUEVA ESPARTA: 1 male ex *Pteronotus parnellii*, 11 males and 9 females ex *Leptonycteris curasoae*, 3 km NE La Asunción, Isla Margarita, 305 m, 20-I-67; 44 males, 30 females, and 1 sex undet. ex *Pteronotus parnellii*, 86 males and 49 females ex *Leptonycteris curasoae*, 3 km S La Asunción, Isla Margarita, 53 m, 16-I–7-II-67.

SUCRE: 45 males and 36 females ex *Pteronotus parnellii*, 10 km NE Güiria, Ensenada Cauranta, 90 m, 7-VI-67; 1 male and 1 female, same host, 12 km NE Güiria, Ensenada Cauranta, 90 m, 17-VI-67; 3 males and 3 females, same host, 9 km NE Güiria, Ensenada Cauranta, 1-4 m, 3-5-VI-67; 42 males and 42 females ex *Leptonycteris curasoae*, 16 km E Cumaná, 1 m, 21-31-XII-66.

T. F. AMAZONAS: 3 males ex *Pteronotus parnellii*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-11-IV-67; 1 female ex 1 *Eumops glaucinus*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 17-VII-67.

TRUJILLO: 1 female ex 1 *Artibeus jamaicensis*, 23 km N Valera, nr. Agua Viva, Valera, 164 m, 23-X-65.

YARACUY: 3 females ex *Pteronotus davyi*, 190 males and 96 females ex *Pteronotus parnellii*, 4 males and 1 female ex 4 *Pteronotus suapurensis*, 20 km NW San Felipe, Minas de Aroa, 380-400 m, 6-23-XII-67; 1 male and 1 female ex *Pteronotus parnellii*, 11 km NW Urama, El Central, Urama, 25 m, 14-III-66.

ZULIA: 117 males and 118 females ex *Lep-*

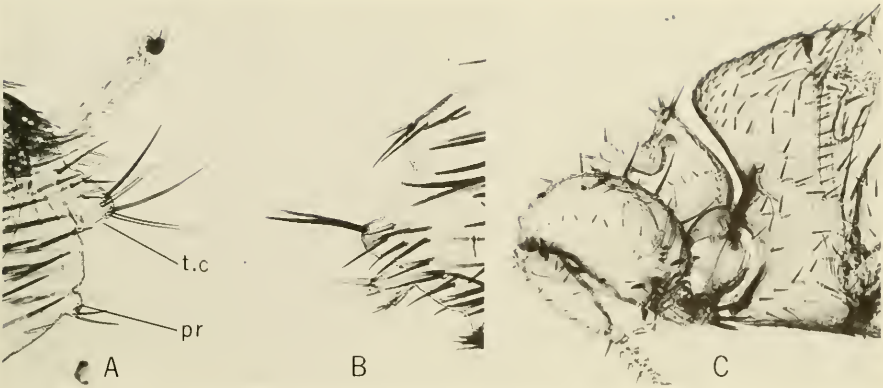

Fig. 11. A-B, apex of female abdomen, lateral views: A, *Nycterophilia fairchildi* Wenzel; B, *Nycterophilia parnelli* Wenzel; C, *Nycterophilia mormoopsis,* new species, male (Guatemala, FMNH 64995): head, thorax, and forelegs, lateral view. A-B from Wenzel et al. (1966).

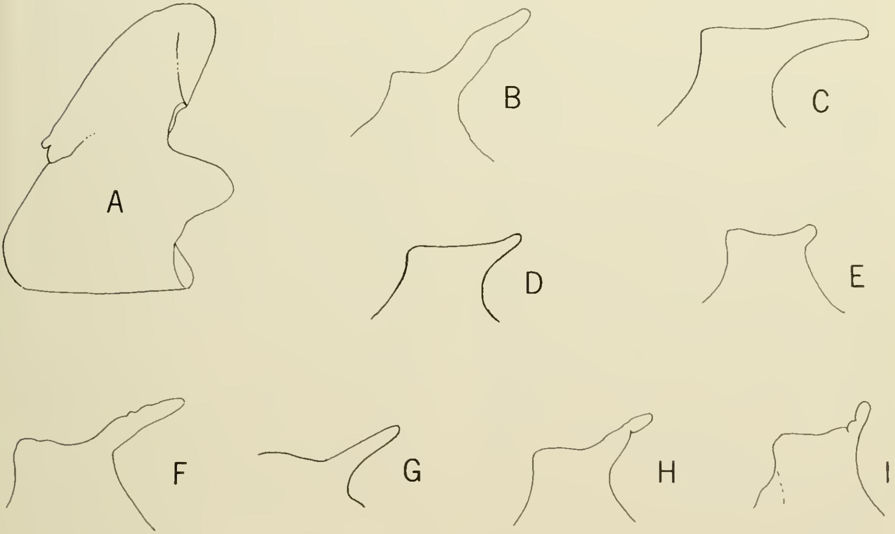

Fig. 12. Metacoxal spurs and lobes of Nycterophiliinae: A, *Phalcophila puliciformis*, new genus, new species; B, *Nycterophilia mormoopsis,* new species ex *Mormoops megalophylla* (SVP 13230); C, *Nycterophilia natali* Wenzel ex *Natalus tumidirostris* (SVP 24001); D, *Nycterophilia fairchildi* Wenzel (holotype) ex *Pteronotus suapurensis;* E, *Nycterophilia parnelli* Wenzel ex *Pteronotus parnellii* (SVI 7894); F-I, *Nycterophilia coxata* Ferris (F, ex *Macrotus mexicanus;* G, type, California; H-I ex *Leptonycteris curasoae*, Venezuela).

tonycteris curasoae, 35 km NNE Paraguaipoa, nr. Cojoro, 5-15 m, 20-VI–1-VII-68; 181 males, 168 females and 1 sex undet., same host, 36 km NNE Paraguaipoa, nr. Cojoro, 15 m, 29-VI–1-VII-68.

Other Material Examined

COLOMBIA: 1 male and 4 females ex *Mormoops megalophylla*, Dept. Bolívar, Cartagena, 2-VI-66 and V-67, C. J. Marinkelle.

Host Associations

Of the 7200 specimens of *Nycterophilia coxata* that were collected in Venezuela by the survey teams from 475 separate host bats, 6,185 (86 percent) were from 250 *Leptonycteris curasoae*, 700 (9.7 percent) from 139 *Pteronotus parnellii*, 192 (2.6 percent) from *Pteronotus davyi* and 97 (1.3 percent) from 17 *Mormoops megalophylla*. The numbers from other hosts are insignificant. From the host distribution, it is clear that *coxata*, like other species of *Nycterophilia*, is primarily a parasite of cave bats. Although it is a facultative parasite of other hosts in Venezuela, especially *P. parnellii*, *P. davyi*, and *M. megalophylla*, its primary host in Venezuela is clearly *L. curasoae*.

Both *P. parnellii* and its characteristic parasite, *Nycterophilia parnellii*, were collected in Panama (Wenzel et al., 1966) but *N. coxata* was not, nor (significantly) were bats of the genus *Leptonycteris*. Species of *Macrotus*, the other North American host of *coxata*, do not occur in Panama either.

Remarks

It is with some reservations that I have assigned all of the above specimens to *N. coxata*. Until now, to my knowledge, *coxata* has not been collected south of Mexico. However, the specimens from *L. curasoae* agree well with the type of *coxata* (from California ex *Macrotus californicus*) as well as with specimens taken from "*Leptonycteris nivalis*" (= *L. sanborni*) in Arizona and from *Macrotus mexicanus* in Puebla, Mexico, except that the metacoxal spur is not as strongly developed as in those specimens (Fig. 12 F-G). In some Venezuelan specimens, this spur is so weakly developed (Fig. 12I) that it approaches the condition found in *N. parnelli*. Such male specimens can be separated from *N. parnelli* by the shape of the male hypandrium + postgonites and the females by having only 2 rather than 4 macrosetae on the terminal cone.

Nycterophilia fairchildi Wenzel

(Fig. 10D, 11A, 12D)

Nycterophilia fairchildi Wenzel, 1966:436, Fig. 47B, 49B, 51B.

Venezuelan Survey Records (1,049 males, 669 females, 9 sex undet.)

DTO. FEDERAL: 1 female ex *Pteronotus parnellii* nr. El Limón, 48 km W Caracas, Hda. Carapiche, 398 m, 20-VIII-66.

FALCÓN: 930 males, 564 females, and 8 sex undet. ex *Pteronotus davyi*, 5 males and 4 females ex *Pteronotus parnellii*, 44 males and 39 females ex 14 *Mormoops megalophylla*, 45 males, 30 females, and 1 sex undet. ex 24 *Leptonycteris curasoae*, 7 males and 2 females ex 5 *Natalus tumidirostris*, 7 km W Pueblo Nuevo, Cueva del Guano, Península de Paraguaná, 120 m, 10-31-VII-68.

LARA: 1 male ex *Pteronotus davyi*, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 528 m, 14-VII-68.

SUCRE: 1 male ex *Pteronotus davyi*, 26 km ESE Carúpano, Manacal, 400 m, 16-XII-67.

YARACUY: 4 males and 12 females ex *Pteronotus davyi*, 1 male ex *Pteronotus parnellii*, 11 males and 16 females ex 15 *Pteronotus suapurensis*, 1 female ex 1 *Vampyrops helleri*, 20 km NW San Felipe, Minas de Aroa, 380-400 m, 12-23-XII-67.

Other Venezuelan Records

ARAGUA: 1 female ex *Pteronotus suapurensis*, Biological Station, Rancho Grande, 30-III-60, C. O. Handley, Jr.

Host Associations

Of 1,727 specimens (154 collections) of *Nycterophilia fairchildi* collected by the survey teams, 1,520 (88 percent) were from 89 *Pteronotus davyi*, 85 (4 percent) were from 14 *Mormoops megalophylla*, 75 (4 percent) were from 24 *Leptonycteris curasoae*, 26 (1 percent) were from 15 *Pteronotus suapurensis*, 12 (0.7 percent) from 6 *Pteronotus parnellii*, and 9 (0.5 percent) from 5 *Natalus tumidirostris*. The record of a single specimen from *Vampyrops helleri* is suspect.

Pteronotus davyi, the principal host from which *N. fairchildi* was collected in Venezuela, does not occur in Panama. The type and most other paratypes from Panama were from *P. suapurensis*, *P. personatus*, and *Pteronotus* species. A series (Wenzel et al., 1966) of paratypes from Colombia (Marinkelle) were reported to be from *P. personatus*.

Nycterophilia mormoopsis, new species

(Fig. 11C, 12B)

Nycterophilia n. sp., Whitaker and Easterla, 1975:243-244.

Distinct from all other known species in possessing an isolated longitudinal row of setae that extends along midwidth of outer face of profemora. Head with 3 postgenal spinelets. Chaetotaxy of head and thorax very similar to that of *Nycterophilia parnelli*, *coxata*, and *natali* and similar to *coxata* and *natali* in possessing a well-developed metacoxal spur. FEMALE. Abdomen distinctive in the great reduction of the median chaetotaxy of the dorsal connexivum, especially of segments 4-5, each of which possesses only a single pair of weak setae, these much shorter and very inconspicuous compared to those of the lateral connexivum. In other species these are at least as long as the lateral connexival setae, if not as coarse, and generally there are several setae per segment. Terminal cone with 4 macrosetae. MALE. Dorsal connexival setae of abdomen, similar to those of *coxata*, i.e., barely distinguishable. Clasper shafts slender as in *natali*.

DESCRIPTION

Head. Eyes 1-faceted, pigmented. Chaetotaxy including laterovertices and occipital lobes very similar to that of *N. parnelli;* sides of head with a transverse row of 5 or 6 short setae, lower half of posterolateral occipital margin with about 4, upper half with 1 or 2 very pale weak setae; 3 postgenal spinelets.

Thorax. Prescutal chaetotaxy very similar to that of *parnelli*. Scutum with 4 median discal setae arranged in 2 pairs in tandem, the anterior pair somewhat longer; anterolateral angles with 2 prominent, strong setae; posterolateral angles with 2 setae, the outer one short, the inner one long and stout, scutellum with 2 very long setae. Chaetotaxy of mesepisternum very similar to that of *parnelli*, with 6 to 8 discal setae.

Wings. As in *N. coxata*.

Legs. Upper margin of profemora with a short spinelet near base, a small, short seta distal to this, and about 5 long, strong setae alternating with short setae; outer face with a dorsal submarginal row of setae which are shorter near base and somewhat longer distally, this extending to near apex; a single isolated submedian row of about 11 rather short, slender setae extends across length of outer face; ventral margin with several short marginal setae and near base a few submarginals; chaetotaxy of inner face very similar to that of *parnelli* and *fairchildi*. Metacoxal spur long, strong, usually weakly bent. Metafemur with a row of rather short, closely placed setae along upper margin; outer face with about 3 longitudinal rows of setae, setae of the 2 ventral rows somewhat longer; a conspicuously longer seta present along ventral margin proximal to unsclerotized "notch" and another shorter one between this and proximal end; inner face without conspicuous chaetotaxy except for a short setae or two near apex. Metatibial chaetotaxy as in other species of the genus: 2 subapical bifid setae on outer margin; outer face with rather uniform setae consisting of 2 longitudinal rows and a row along dorsal and ventral margin, 1 distinctly longer subapical seta and an apical spurlike seta on ventral margin at apex; inner face with a ventral submarginal row and a couple of setae near midlength, as well as the usual elongate apical patch of dense microsetae.

Abdomen. FEMALE. Tergum 1 with a row of 5-6 stout setae along posterior margin on each side, the inner 3 short, the outer ones progressively longer; anterior face with 2 additional setae; each lateral lobe of tergum 2 with 2 very long and a shorter stout spinelet anterior to these on apical margin, and about 7 setae; inner posterior margin of tergum 2 with 4 slender setae, 2 on each side. Dorsal connexivum bare except as follows: tergum 3 (3-6 membranous) with 2 rows of setae which are continuous with the coarse lateral connexival setae, the anterior row consisting of 4 more conspicuous setae, the posterior row consisting of 4 more medially placed, very weak, shorter, slender setae and 2 more conspicuous lateral ones on each side; terga 4 and 5 each with a median pair of weak, slender setae; tergum 6 with 4 long, conspicuous setae similar to those of sides of connexivum; tergum 7 sclerotized, small, oval, transverse, with 4 similar setae. Terminal cone with 4 macrosetae. Connexivum laterally and ventrally with numerous coarse setae, these longer and more conspicuous on dorsal half, becoming finer and somewhat shorter toward the venter and again longer and more conspicuous along the venter. Dorsal (lateral) apical lobe of sternum 1 with about 5 conspicuous setae around margin; ventral to these along lateral margin are about 4 fine setae; ventral median projection with 2 conspicuous setae. Posterior margin of sternum 2 with conspicuous strong setae, the more dorsal ones stouter. Sternum 6 with about 8-10 conspicuous stout setae along posterior margin. Sternites 7 weakly sclerotized, with 6-7 bristles along posterior margin, several conspicuously longer than the others, and several submarginal bristles, the more median ones conspicuously longer than the others. MALE. Chaetotaxy of terga 1 and 2 very similar to that of female except that the pair of setae on each side of midline of posterior margin consists of 1 longer and 1 short setae. Dorsal connexivum bare except for 3 median segmental pairs of very short inconspicuous pale setae; dorsolateral setae very long, conspicuous. Setae of sterna conspicuously longer dorsally and becoming much shorter and finer toward venter excepting those along median line which are stout and spiniform. Sternum I with 5 conspicuous spiniform setae along dorsal (lateral) margin of lobe and about 3 to 4 other much shorter, less conspicuous setae. Upper portion of tergum 9 with 4 conspicuous setae and distal to those an oblique row of about 3 or 4 shorter setae. Free shaft of clasper with 4 or 5 conspicuously long setae; base with about 8 other irregularly placed setae, one of these very long and conspicuous. Hypandrium (+ postgonites) nearly as long as shaft. Aedeagus ribbonlike distally.

Measurements

	Males	Females
BL	1.15-1.19	1.00-1.50
TL	0.39-0.44	0.42-0.47
HFL	0.42-0.47	0.49-0.52

Type Data: Male holotype (FMNH) ex *Mormoops megalophylla* (FMNH 64995-65015), Guatemala, Peten, Jobitzinal Cave, Santa Elena, 4 mi W Flores, 200 m, 9-XI-48, Luis de la Torre. Female allotype (FMNH), same data. Paratypes—COLOMBIA. Bolívar: 22 males and 21 females (8 lots) ex *Mormoops megalophylla*, various dates, V-VI-66—V-VI-67; 1 female ex *Molossus molossus*, V-67; 2 males ex 1 *Pteronotus suapurensis*, 2-VI-66; 1 male and 1 sex undet. ex *Pteronotus parnellii*, VI-67, Cartagena, C. J. Marinkelle.

GUATEMALA. Alta Vera Paz: 1 female (FMNH) ex *Mormoops megalophylla*, Cueva de Lanquin, Lanquin, 1000 ft elev, 31-V-48, Rodger D. Mitchell and Luis de la Torre; Izabal: 1 male (FMNH) ex *Mormoops megalophylla*, Gruta Silvino, 22-VIII-69, S. and J. Peck.

MEXICO. Puebla: 8 males and 10 females (AMNH, FMNH) ex 5 *Mormoops megalophylla* and 1 female (AMNH) ex *Pteronotus parnellii mexicanus*, 11 km W Piaxtla, 4-I-54, R. G. Van Gelder and 1 male (AMNH) ex *Natalus stramineus mexicanus*, 20 mi E Raboso, 9-I-54, R. G. Van Gelder; Sinaloa: 1 female (CNC) ex *Mormoops megalophylla*, Santa Lucia, 3200 ft elev, 28-VII-63, J. O. Smith.

VENEZUELA. Falcón: 42 males and 23 females ex *Mormoops megalophylla*, 1 sex undet. ex *Pteronotus davyi*, 7 km W Pueblo Nuevo, Cueva del Guano, Península de Paraguaná, 120 m, 21-31-VII-68; Sucre: 22 males and 21 females ex *Mormoops megalophylla*, Ensenada Cauranta, 9-11 km NE Güiria, 1-90 m, 3-7-VI-67; Yaracuy: 1 female, same host, 20 km NW San Felipe, Minas de Aroa, 395 m, 11-XII-67.

Host Associations

It is evident from the data that *N. mormoopsis* is a characteristic parasite of *Mormoops megalophylla*. Some of the records from other hosts are probably contaminants, but it would be expected that this fly would occasionally be found on other hosts in cave situations.

Nycterophilia natali Wenzel

(Fig. 10A, B; 12C)

Nycterophilia natali Wenzel, 1966:438, Fig. 48A, 50A.

Venezuelan Survey Records (28 males, 12 females, 2 sex undet.)

FALCÓN: 25 males, 9 females and 1 sex undet. ex *Natalus tumidirostris*, 7 km W Pueblo Nuevo, Cueva del Guano, Península de Paraguaná, 120 m, 22-31-VII-68.

LARA: 1 male ex *Natalus tumidirostris*, 2 males, 3 females, and 1 sex undet. ex 1 *Pteronotus parnellii*, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 521-528 m, 14-17-VII-68.

Remarks

I provisionally refer these specimens to *N. natali*. The males compare well with the type of *natali*, which was taken from *Natalus stramineus mexicanus* in Panama, but I have no females from that host that I can compare with Venezuelan females from *N. tumidirostris* and they could prove to be distinct.

Nycterophilia parnelli Wenzel

(Fig. 8A, 10C, 11B, 12E)

Nycterophilia parnelli Wenzel, 1966:434, Fig. 45A, 46, 47A, 51C.

Venezuelan Survey Records (122 males, 84 females)

APURE: 1 male ex *Pteronotus parnellii*, 1 female ex 1 *Lonchorhina orinocensis*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 24-28-XII-65; 1 male ex *Pteronotus parnellii*, 1 km W Pto. Páez, Cerro de Murcielagos, Pto. Páez, 76 m, 19-I-66.

BOLÍVAR: 49 males and 46 females ex *Pteronotus parnellii*, 5 km NNW Guasipati, Guasipati, 190 m, 29-IV-66; 5 males and 6 females, same host, 47 km ESE Caicara, Hato La Florida, 50 m, 19-24-IV-67; 1 male, same host, 85 km SSE El Dorado, km 125, 1,032 m, 11-V-66; 1 female, same host, 28 km SE El Manteco, Los Patos, 150 m, 11-IV-66; 11 males and 3 females, same host, 50 km SE El Manteco, Río Supamo, 150 m, 10-IV-66.

CARABOBO: 1 male ex *Pteronotus parnellii*, 6 km N Urama, Urama, 60 m, 17-III-66; 1 male ex 1 *Lonchorhina aurita*, 3 km W Montalbán, La Leonera, Montalbán, 900 m, 22-XI-67.

FALCÓN: 1 male ex *Pteronotus parnellii*, 19 km NW Urama, Km 40, Urama, 25 m, 28-X-65.

LARA: 4 males ex *Pteronotus parnellii*, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 528 m, 14-VII-68.

T. F. AMAZONAS: 2 males ex *Pteronotus parnellii*, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 17-23-III-67; 5 males and 4 females, same host, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 6-IX–2-X-67; 27 males and 18 females, same host, 1 male ex 1 *Sturnira tildae*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-11-IV-67; 3 males and 2 females ex *Pteronotus parnellii*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 12-27-VII-67; 9 males and 1 female, same host, Río Orinoco, Tamatama, 135 m, 27-IV-67.

YARACUY: 2 females ex 2 *Pteronotus davyi*, 20 km NW San Felipe, Minas de Aroa, 395 m, 21-23-XII-67.

Other Venezuelan Records

ARAGUA: 1 male ex "*Chilonycteris rubiginosa fusca*" (= *Pteronotus parnellii fuscus*), Biol. Station, Rancho Grande, 7-IX-62, J. V. Scorza, C. Machado, and M. Ramirez; 32 males and 37 females ex "*Enchisthenes hartii*" (= *Artibeus harti*) (!), same locality data, 29-VIII-62, J. V. Scorza, C. and A. J. Machado.

BOLÍVAR: 3 males and 8 females ex "*Chilonycteris rubiginosa*," Serrania de Nuria, 31-VIII-62, J. Ojasti.

Host Associations

Of 206 specimens of *N. parnelli* that were collected by the survey teams in Venezuela, 201 (97.5 percent) were from 63 *Pteronotus parnellii*, 2 (0.9 percent) from *Pteronotus davyi* and a single specimen each from 3 non-mormoopid hosts. All specimens collected in the field in Panama were also from that host, as are almost all other specimens that I have seen. The Venezuelan record from *Enchisthenes harti* is dubious. It seems likely, from associated information, that it represents an error in labeling.

Remarks

It is very interesting (see under *N. coxata* above) that although *N. parnelli* appears to be essentially a monoxenous parasite of *P. parnellii*, nonetheless *N. coxata* (which is not) appeared to occur more abundantly and on more individual specimens of that host than did *N. parnelli*. There are other interesting facets of these relationships that will be treated later in the summarizing paper on the results of the survey.

Subfamily Trichobiinae

Genus *Trichobius* Gervais

Trichobius Gervais, 1844:14
  Type Species: *Trichobius parasiticus* Gervais, 1844:14
Kolenatia Rondani 1878:169
  Type Species: *Strebla wiedemanni* Kolenati, 1863 (not *Strebla wiedemanni* Kolenati, 1856)
Trichobius Townsend, 1891:105 (preocc. Gervais, 1844)
  Type Species: *Trichobius dugesii* Townsend, 1891:106
Kesselia Curran, 1934:522
  Type Species: *Trichobius pallida* Curran, 1934:522

Wenzel (1970) listed 34 species of *Trichobius*. In 1974, Peterson and Hurka described 10 more. The Venezuelan collections studied included 41 species of *Trichobius*, 21 of them new, bringing the total number of described species to 65. Additional undescribed species are represented in the collections of Field Museum and elsewhere.

While the genus is diverse and should probably be further divided, there is remarkable homogeneity within some groups. Many of the species are extraordinarily similar and difficult to identify without comparative collections of authoritatively identified material.

The following key reflects these difficulties. I have tried to prepare it so as to facilitate accurate identification without necessarily grouping related species.

In many instances, it is necessary to examine both liquid preserved specimens and slide preparations. For example, the microtrichia on the mesonotum can rarely be detected using the relatively low magnifications of stereo-dissecting microscopes. One must examine cleared specimens on slides, using a compound microscope. If series are small, it may be desirable to clear the specimens with caustic or acid and preserve them in glycerin, for occasional transfer to glycerin gel or similar media on slides. In this way, the specimen is not "irrevocably" committed in a permanent mounting medium.

Perhaps the most difficult species to identify are those of the *dugesii* group, especially of the *dugesii* complex. In most of these species, the male postgonites are asymmetrical and strongly twisted and curved to the left, making it extremely difficult to maintain a uniform orientation on slides for comparison in identifying material or for preparing illustrations. The least difference in orientation can result in a quite different appearance in shape. Thus, when these structures are very similar between species, both in shape and chaetotaxy, comparison of postgonites is almost impossible if the orientation is not almost precisely the same. Their minute size renders it impractical to preserve the postgonites separately, because they are too easily lost. In some instances, they can be extended from the abdomen and cleared, still attached, and then examined in glycerin gel or a similar median on a slide. In the future, it may be desirable to illustrate them from several angles, using the scanning electron microscope.

It should be noted that the curving and twisting to the left of the male postgonites is most pronounced in species of the *dugesii* complex of the *dugesii* group. Only one species of this complex—*T. handleyi*—has nontwisted postgonites. In many respects, *handleyi* is closer to the species of the *parasiticus* complex, but it has a very short metasternal lobe and a very thin, threadlike sternum 6. Morphologically it can be regarded as being intermediate between species of the two complexes. In *T. dugesii, joblingi, propinquus, brevicauda,* and *macrophylli,* the postgonites are so strongly twisted that their apices are nearly at right angles to the vertical axis of the hypandrium. They are much less strongly twisted in *urodermae, assimilis, angulatus,* and *intermedius.* They are not twisted in any species of the *parasiticus* group, which, interestingly, occur chiefly on desmodontids and generalized phyllostomines (*Micronycteris* and *Lonchorhina*). The postgonites are curved to the left but not strongly so in *T. longipes,* and so slightly in *dybasi, mendezi, silvicolae,* and *affinis* as to be hardly noticeable. They are not twisted in the *caecus* and *uniformis* groups nor in the *phyllostomae* group, though in species of the latter group they are asymmetrical without the twisting.

I am not aware of asymmetrity in the postgonites of any other New World streblids.

Key to Venezuelan Species of *Trichobius*

1. Eyes a single facet 2
Eyes multifaceted 8

2. Scutellum and a broad median area of mesonotal disc without microtrichia (these usually visible only in slide preparations). Female. Postgenital sclerite as in Fig. 16K; basal portion (tergum 7) of terminal cone with 2 strong, rather closely placed setae and occasionally a third shorter seta (Fig. 16J). Male. Hypopygium (sternum 7+8, tergum 9) with long sparse setae dorsally and apically; postgonites strongly curved (Fig. 16L) .... *galei* Wenzel
Scutellum and mesonotum covered with microtrichia throughout. Female. Basal portion of terminal cone with at least 2 widely separated macrosetae and 2 or 3 additional, usually much shorter setae between these. Male. Setae of hypopygium short except along apical margin 3

3. Females 4
Males 6

4. Lateral margin of each lateral lobe of tergum 1+2 deeply emarginate, bilobed (Fig. 14C); chaetotaxy of terminal cone as in Fig. 15A .... *bilobus* n. sp.
Lateral lobes of tergum 1+2 not emarginate, chaetotaxy of terminal cone as in Fig. 16A, G 5

5. Chaetotaxy of lateral lobes of tergum 1+2 as in Fig. 14A. Postgenital sclerite as in Fig. 16H. .... *johnsonae* Wenzel
Chaetotaxy of lateral lobes of tergum 1+2 as in Fig. 14B. Postgenital sclerite as in Fig. 16B. .... *caecus* Edwards

6. Lateral lobes of tergum 1+2 with only 6-9 setae (Fig. 14A). Postgonites as in Fig. 16I. .... *johnsonae* Wenzel
Lateral lobes of tergum 1+2 with 11-16 setae (Fig. 14B) 7

7. Postgonites as in Fig. 16C .... *caecus* Edwards
Postgonites as in Fig. 15B .... *bilobus* n. sp.

8. Sixth longitudinal wing vein with long setae at basal angle 9
Sixth longitudinal wing vein without setae at or near basal angle 12

9. Wing vein R_1 strongly sinuate, the costal cell rather abruptly narrowed apically; R_s markedly longer than distance between fork and crossvein *r-m*, and the latter distance no more than twice the length of *r-m*. FEMALE. With a distinct cluster of longer discal setae in posterior angles of sternum 2. MALE. Postgonites (Fig. 21D), wedge shaped in lateral view, ventral margin nearly straight, with a submarginal row of fine setae ..... *lonchophyllae* Wenzel
Wing vein R_1 straight or only very feebly sinutae, the costal cell rather evenly tapered or nearly subparallel apically; length of R_s and distance between fork and crossvein *r-m* subequal, the latter distance more than twice the length of *r-m*. FEMALE. Marginal setae of sternum 2 longer toward posterior angles but discal setae not longer within the angles. MALE. Postgonites (Fig. 21A-C) ventrally curved and tapered, at most with 1 or 2 submarginal setae along ventral margin 10

10. Posterior margin of each occipital plate with a prominent posteriorly directed tubercle which bears a very short spineletlike seta; eyes separated by their width or more from lateral margin of head. MALE. Postgonites as in Fig. 21B ..... *uniformis* Curran
Posterior margin of each occipital plate with a short seta borne on an inconspicuous tubercle, the seta not a spinelet; eyes extending to lateral margins of head or separated from margins by less than their width 11

11. FEMALE. Four setae of tergum 7 arranged in a transverse row. MALE. Postgonites as in Fig. 21A ..... *keenani* Wenzel
FEMALE. Four setae of tergum 7 arranged one pair behind the other, the anterior and posterior pairs widely separated. MALE. Postgonites as in Fig. 21C ..... *lionycteridis* Wenzel

12. Median and transverse mesonotal sutures united[5] 13
Median and transverse sutures not united 15

13. Mesonotum with a large median discal area that is essentially bare; scutum with an irregular single or double W-shaped antescutellar row of short setae 14
Mesonotum setose throughout, scutum with a row of 8-10 very long antescutellar setae, in addition to rather long discal setae which are about half the length of the antescutellars and marginals ..... *longipilis* n. sp.

14. Size larger; TL, males 0.60-0.63 mm, females 0.66-0.77 mm. Prescutum with 2 short microsetae on each side near transverse suture; W-shaped row of short antescutellar setae single. MALE. Postgonites as in Fig. 19A ..... *sphaeronotus* Jobling
Size smaller; TL, males 0.47-0.52, females 0.54-0.57. Prescutum with 2 macrosetae on each side near transverse suture; W-shaped row of short antescutellar setae irregularly double. MALE. Postgonites as in Fig. 19D ..... *leionotus* n. sp.

15. Eyes with 24-36 facets 16
Eyes with 7-12 facets 19

16. Occipital lobes of head with approximately 17-18 setae of varying lengths, all of them strong, a number of them as long or longer than width of lobe, those along posterior margin much shorter, the anteromedian one as long as head is wide. Mesosternum with strongly oblique sides (much as in Fig. 4E); metasternal lobe united with the metepimeron ..... *imitator* n. sp.
Occipital lobes with only 9-12 setae. Mesosternum strongly projecting between the coxae as in Fig. 4D; sides feebly oblique, nearly subparallel, anterior margin broad, subtruncate; metasternal lobe long, ascending dorsally and sometimes in contact but not actually united with metepimeron 17

17. Head of usual shape. Disc of mesonotum with dense, rather short setae; setae on scutum in front of antescutellar row distinctly larger, the antescutellar setae nearly

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[5] In *longipilis* n. sp., the sutures may be feebly or not united in the males. The species is keyed out under both alternatives.

twice as long; scutellars slightly longer than width of scutellum. Anterior margin of mesosternum strongly emarginate .... *vampyropis* Wenzel

Head (from above) broader, oblong, resembling that of *Paratrichobius* species; occipital lobes strongly transverse, rather short, each with 11-12 strong setae, 2 of them macrosetae. Mesonotal disc sparsely setose, the setae longer; scutellar setae, at least the median pair, markedly longer than width of scutellum. Anterior margin of mesosternum feebly emarginate, nearly truncate 18

18. Occipital lobes of head with ± 12 setae, including 2 conspicuously longer macrosetae. Dorsal and lateral abdominal connexivum with short setae only, excepting 1-4 stronger longer setae behind lateral lobes of tergum 2. Male. Postgonites as in Fig. 28I .... *petersoni* n. sp.

Occipital lobes with about 9 setae, including 2 conspicuously longer macrosetae. Dorsal abdominal connexivum with conspicuous, long, slender, semierect setae usually in segmentally arranged clusters or transverse rows of 3-5 each, sometimes of varying lengths, less numerous in males than females, and including a group of long setae behind lateral of tergum 1+2 in both sexes. Male. Postgonites as in Fig. 28G, H .... *hispidus* n. sp.

19. Disc of mesonotum with conspicuous bare areas, at least anteriorly on the scutum 20

Mesonotum essentially setose throughout, though median discal setae of prescutum and scutum may be much shorter and denser than the others 24

20. Prescutum with a longitudinal cluster of short setae between median and transverse sutures (Fig. 27A). Metasternal lobe well developed, extending dorsally and united with the metepimeron .... *costalimai* Guimaraes

Prescutum without such a cluster of setae. Metasternal lobe absent 21

21. Laterovertices and occipital lobes of head not well differentiated. Scutal setae of antescutellar row long, mostly ½ to ¾ as long as scutellum, or longer 22

Laterovertices and occipital lobes well defined. Setae of antescutellar row minute 23

22. Scutum with a single row of short setae at middle immediately in front of the long antescutellars; Female. Tergum 7 very small, transverse, narrower than proctiger, not united with supra-anal plate; ventral arc without conspicuous flange. Male. Sternum 5 well developed, 6th absent. Postgonites feebly curved (Fig. 17C) .. *sparsus* Kessel

Scutum with at least 2 rows of short setae at middle immediately in front of the antescutellars. Female. Tergum 7 conspicuous, distinctly wider than proctiger, usually about twice as long as broad, usually connected with the supra-anal plate; ventral arc with conspicuous lateral, lobelike flanges. Male. Sternum 5 absent, 6 well developed. Postgonites strongly curved, almost hooklike (Fig. 19B) .... *parasparsus* n. sp.

23. Prescutum with very short discal setae immediately in front of the transverse suture, but rarely with more than 1 or 2 other short setae anterior to these; scutum posteriorly with an irregular W-shaped row of short setae, without scattered setae anterior to these. Male. Postgonites as in Fig. 25A .... *parasiticus* Gervais

Prescutum with at least several discal microsetae between the transverse row along suture and apex of median suture; scutum with scattered, sometimes numerous microsetae between the W-shaped row and the transverse mesonotal suture. Male. Postgonites as in Fig. 26J .... *diaemi* n. sp.

24. Occipital lobes of head densely setose, with 16-18 setae. Metasternal lobe united with metepimeron .... *jubatus* n. sp.

Occipital lobes with 9-11 setae 25

25. Metasternal lobe absent (Fig. 4C) 45

Metasternal lobe present (Fig. 4A, B) 26

26. Metasternal lobe very short, narrow, pointed (triangular). Laterovertices and occipital lobes not "completely" differentiated. Mesonotum appearing more or less

uniformly setose; median discal setae shorter and slightly denser, but still long and conspicuous .... *longipilis* n. sp.

Metasternal lobe often short, but broad and rounded, not pointed. Laterovertices and occipital lobes clearly differentiated. Discal mesonotal setae conspicuously short and denser than the anterolateral prescutal setae 27

27 Metasternal lobe complete, ascending and united with the metepimeron (Fig. 4A). (This can be determined accurately only by manipulation under stereo-dissecting microscope, preferably with liquid preserved specimens.) 28

Metasternal lobe not united with the metepimeron (Fig. 4B) 30

28. Anterior margin of mesosternal projection broad, obtuse and slightly notched at middle (Fig 4E) or subtruncate 28a

Anterior margin of mesosternal projection narrowly rounded as in species of the *Trichobius caecus* group .... *strictisternus* n. sp.

28a. Size larger; TL, males 0.70-0.71 mm, females 0.78-0.82 mm. Margins of oral cavity strongly convergent posteriorly. Female. Abdominal connexivum behind lateral lobe of tergum 1+2 with a cluster of setae which are distinctly stronger than those following. Prescutal chaetotaxy distinctive in that there are very long setae near midline which are preceded by shorter setae near anterior margin. Male. Postgonites as in Fig. 28B .... *longipes* (Rudow)

Size smaller; TL, males 0.54-0.59 mm, females 0.55-0.67 mm. Female. Abdominal connexivum without cluster of stronger setae behind lateral lobes of tergum 2. Prescutal chaetotaxy not thus 29

29. Eyes smaller, each laterovertex about half again as wide as length of eyes. Margins of oral cavity subparallel or feebly convergent then broadly rounded posteriorly. Male. Postgonites as in Fig. 28C .... *affinis* n. sp.

Eyes (including facets) larger, width of their length only slightly less than width of each laterovertex. Margins of oral cavity strongly convergent posteriorly as in *longipes* and *mendezi*. .... *silvicolae* n. sp.

30. Transverse mesonotal suture very strongly angulate (Fig. 24A, B) 31

Transverse mesonotal suture usually rather weakly angulate, bowed, or transverse 32

31. Underside of palpi setose on a little more than basal half. Median discal mesonotal setae relatively sparser and shorter (Fig. 24B); scutum at midline with only 2 irregular rows of minute setae between antescutellar row and transverse suture. Female. Each lateral margin of supra-anal plate with a minute seta. Male. Postgonites as in Fig. 26A .... *assimilis* n. sp.

Underside of palpi setose on about basal half or less. Median discal setae generally denser and a little longer (Fig. 24A); scutum at midline usually with several (rarely 2) irregular rows of minute setae between antescutellar row and transverse suture. Female. Each lateral margin of supra-anal plate with a strong seta which is about ⅓ to ½ as long as distal macrosetae. Male. Postgonites as in Fig. 26B .... *angulatus* n. sp.

32. Males 33

Females 40

33. Sternum 6 absent 34

Sternum 6 present, though it may be very small and difficult to see 35

34. Eyes large, approximately as long as greatest width of each laterovertex; palpi more rounded, scarcely longer than broad. Prescutal setae very gradually longer outwardly from median discal area in front of transverse suture, those on middle half of anterior margin only about 2 - 2½ times longer than short discal setae and distinctly shorter than those in anterolateral angles. Metasternal lobe usually very short, scarcely discernable .... *macrophylli* Wenzel

Eyes smaller, length not much more than half of basal width of each laterovertex; palpi more elongate, distinctly longer than broad. Prescutal setae rather abruptly longer outwardly from median discal area, median setae along anterior margin about 4 times as long as shorter discal setae and of about same length as those in anterolateral angles. Metasternal lobe well developed .... *persimilis* n. sp.

35. Prescutum covered with microtrichia in a broadly triangular area which begins near basolateral angle and widens out anteriorly so that along anterior margin it includes anterior angles and extends medially nearly to or slightly beyond the second seta inward from the median suture. Eyes very small, length equal to or slightly greater than ½ width of each laterovertex or ½ length of an occipital lobe; underside of palpi densely setose. MALE. Postgonites (Fig. 26E) symmetrical .. . . . *handleyi* n. sp.
Prescutum at most with microtrichia along inner margin of notopleural sutures. Palpi rather sparsely setose beneath 36

36. Eyes large, coarsely faceted, at least as long as greatest width of a laterovertex. Mesonotal chaetotaxy as in Fig. 22F. Lateral and ventral connexival setae minute, conspicuously shorter than discal setae of sternum 2. Postgonites as in Fig. 25I .... *urodermae* Wenzel
Eyes small, with small facets, distinctly shorter than greatest width of a laterovertex. Connexival setae (except in *joblingi*) along lateral margins of abdomen of about same length as discal setae of sternum 2 37

37. Each side of sternum 7+8 with 8-10 strong setae, mostly macrosetae, and 1-2 very short dorsomedian setae. Mesonotal chaetotaxy as in Fig. 24D; setae of antescutellar row very long, mostly 5-6 times as long as the short discal setae of scutum, some extending to sockets of scutellar setae, others to apex of scutellum or beyond. Postgonites as in Fig. 26I .... *tiptoni* n. sp
Each side of sternum 7+8 with at most 4-5 strong setae and 1 or 2 minute dorsomedian setae. Setae of antescutellar row at most 3-4 times as long as short discal setae of scutum, the median ones not extending to sockets of scutellar setae 38

38. Short setae of basal median area of prescutum (Fig. 22D) heavier, darker, and more numerous; antescutellar row of setae usually a mixture of longer and short setae, the longer ones generally 3-4 times as long as the short median discal setae of scutum. Connexival setae along lateral margins of abdomen distinctly shorter than discal setae of sternum 2. Postgonites as in Fig. 25E .... *joblingi* Wenzel

Setae of basal median area of prescutum (Fig. 22A, B) sparser, paler and much finer, those of scutal disc, especially, often difficult to detect in liquid-preserved specimens; setae of antescutellar row usually very short, not much longer than median discal setae of scutum, though some near middle may be twice as long, and a few toward lateral ends of row may rarely be several times as long; but those near middle of row rarely extend more than half the distance to sockets of scutellar setae 39

39. Size larger, TL 0.54-0.57 mm. Prescutum with 42-47 long setae, most of those in anterior angles and along sides as long as or longer than the median suture. Postgonites as in Fig. 26G .... *propinquus* n. sp.
Size smaller, TL no more than 0.50 mm. Prescutum with 34-36 long setae, only a few of these as long as the median suture. Postgonites as in Fig. 25G, H .... *dugesii* Townsend

40. Lateral abdominal connexivum, posterior and sometimes slightly ventral to each lateral lobe of tergum 1+2, with a cluster of at least 3-5 (rarely 1 or 2) setae that are conspicuously coarser and longer than the others[6] 41
Lateral abdominal connexival setae rather uniform, without such conspicuously stronger and larger setae 42

41. Prescutal setae rather evenly distributed, becoming gradually longer anteriorly and laterally (Fig. 22E). Lateral abdominal connexivum with a cluster of 9-13 conspicuously stronger setae behind lateral lobes of tergum 1+2 .... *macrophylli* Wenzel
Median prescutal setae rather abruptly denser and shorter than the longer setae later-

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[6] Occasionally, females of *dugesii* have a couple of somewhat coarser setae, but these are not conspicuously coarser and stronger than the others

ally and anteriorly (Fig. 22D). Lateral abdominal connexivum with 2-5 coarser, stronger setae (occasionally, only 1 or 2) .... *joblingi* Wenzel

42. Prescutum with microtrichia (visible only in slide preparations) distributed in a broadly triangular area on each side, which widens anteriorly from basal angles to include second seta from median suture along anterior margin .... *handleyi* n. sp.
Prescutum with microtrichia only in a very narrow area along margin of notopleural suture 43

43. A larger species, TL 0.66-0.71 mm. Eyes large and conspicuous, their length equal to or greater than width of each laterovertex or greatest length of occipital lobe. Thorax longer (Fig. 22F); prescutal setae very long; short scutal setae, becoming distinctly longer toward sides than at middle. Tergum 7 transverse, the two pairs of setae arranged in a transverse or irregular transverse row, not one pair behind the other, the outer pair longer. Metasternal lobe prominent, rather strongly reflexed dorsally .... *urodermae* Wenzel
Smaller species, TL 0.51-0.60 mm. Eyes smaller, their length distinctly less than width of each laterovertex or greatest length of occipital lobe. Thorax relatively shorter, long prescutal setae shorter (Fig. 22A, C). Short scutal setae of rather uniform length, except that those of antescutellar row may be distinctly longer. Tergum 7 trapezoidal, with two pairs of setae arranged one behind the other, the anterior pair longer (one or both pairs sometimes absent) 44

44. Thorax broader; prescutum with fewer short discal setae (Fig. 22A), these often more abruptly distinct from the longer setae anterior to and lateral to them; setae of antescutellar row generally of about same length or only slightly longer than the short discal setae, sometimes (especially Venezuela specimens) about twice as long. Setae of anterior pair on tergum 7 of about same length as the lateral seta on each side of supra-anal plate. Metasternal lobe usually very short and broad .... *dugesii* Townsend
Thorax less transverse. The short prescutal setae more numerous; setae of antescutellar row conspicuously longer than discal scutal setae anterior to them (Fig. 22C). Setae of anterior pair on tergum 7 only about one-half length of those on each side of supra-anal plate. Metasternal lobe longer, slightly reflexed .... *persimilis* n. sp.

45. A single strong seta inserted near inner posterior angle of each laterovertex 46
One or 2 additional very short setae inserted before or behind this strong seta, or between it and margin. Male. Sternum 7+8 with 16-17 setae. Apices of postgonites strongly curved (Fig. 26F). Female. Tergum 7 very large oblong, sometimes suborbicular and with 13-17 setae, continuous with and wider than supra-anal plate, which has 4 distal macrosetae plus a row of 4 strong setae along base and a strong seta on each lateral margin .... *ethophallus* n. sp.

46. Males 47
Females 50

47. Sternum 7+8 with 7-9 setae on each side, one very short, and one a conspicuously long macroseta, the others long, strong 48
Sternum 7+8 with ± 12 setae, mostly strong, a few short, one distinctly longer than the others. Prescutum on each side with a broad area of microtrichia, this narrower basally and widening out anteriorly to extend about two-thirds distance from lateral margin to median suture; short prescutal (and scutal) setae minute and fine as to be scarcely visible in liquid-preserved specimens (Fig. 23B) of nearly uniform size and abruptly distinct from the very long prescutal macrosetae. Apices of postgonites strongly curved (Fig. 25B) .... *diphyllae* Wenzel

48. Tergum 9 with ca. 11-12 setae, 4 or 5 of these fairly long, the rest short. Scutal setae of antescutellar row short, only slightly longer than discals. Postgonites (Fig. 26H) beset with thornlike setae, nearly straight, apical slightly curved .... *tuttlei* n. sp.
Tergum 9 with ± 18-20 setae, about half of them quite long, on each side 49

49. Size larger, TL 0.49-0.55 mm. Postgonites (Fig. 25D) wedge shaped, ventral margin straight, with numerous denticles. Aedeagus ribbonlike . *dugesioides* Wenzel
Size smaller, TL 0.44-0.51 mm. Postgonites long, slender, curved apically, with a few thornlike denticles on sides, aedeagus flagelliform (Fig. 26C, D) .... *flagellatus* n. sp.

50. Supra-anal plate with 3 distal macrosetae .... *tuttlei n. sp.*
Supra-anal plate with 4 distal macrosetae 51

51. Lateral connexivum immediately behind each lateral lobe of tergum 1+2 with a large patch of 10-12 or more setae that are conspicuously longer than the other minute setae of sides and venter which are quite uniform and only slightly longer distally and on venter 52
Lateral connexivum at most with a few very short but somewhat stronger setae behind lateral lobes of tergum 1+2, these followed by a large area of minute setae which suddenly become markedly longer and uniform to apex, the ventral setae shorter than these and of nearly uniform length. Tergum 7 about as wide as proctiger .... *flagellatus* n. sp.

52. Prescutum along sides, with an extensive area of microtrichia, which widens out anteriorly to extend medially near ⅔ the distance to suture; short prescutal and scutal setae minute, very fine, scarcely detectable and of nearly uniform length (Fig. 25B). Tergum 7 nearly as wide as proctiger .... *diphyllae* Wenzel
Prescutum on each side only, with a very narrow band of microtrichia along lateral margins. Shorter prescutal setae conspicuous (Fig. 25D); antescutellar setae long. Tergum 9 distinctly narrower than proctiger .... *dugesioides* Wenzel

Trichobius pallidus group

Trichobius pallidus (Curran)

(Fig. 13A)

Kesselia pallida Curran, 1934:522

Trichobius pallidus, Wenzel, Tipton, and Kiewliez, 1966:477, Fig. 53

Venezuelan Survey Records (1 male)

T. F. AMAZONAS: 1 male ex 1 *Furipterus horrens,* Río Orinoco, Tamatama, 135 m, 20-IV-67.

Remarks

The single male of this very rare species that was collected by the survey was badly damaged; thus it was not possible to study the structure of the postgonites. Only the basal portion of one is preserved. It superficially appears quite different from the postgonites of *caecus* and related species, both in shape and chaetotaxy. The ventral setae are missing, but the two pairs may be subequal, judging from the size of their sockets. Unfortunately, these cannot be seen in the single type male which I have on loan from the American Museum.

The median suture of the prescutum is not bifurcate in the same manner as in species of the *caecus* group, though a poorly defined, curved internal "line" extends outwardly on each side from the median suture, as in some other *Trichobius* species.

The first tarsomeres of the hindlegs bear a tuftlike seta as in species of the *caecus* group. These are also present, but reduced in the *uniformis* group. They were incorrectly described by Wenzel et al. (1966:445) as "combscales." I have not seen this type of seta in any other New World streblids. Also, as shown in Jobling's (loc. cit.) illustration, the transverse mesonotal suture of *pallidus* has two short, posteriorly directed "spurs." Specimens of *T. uniformis* sometime exhibit similar, but feebly developed, "spurs." It is possible that the *pallidus, caecus,* and *uniformis* groups form a natural cluster.

Trichobius pallidus appears to lack a sixth sternum in the male, while in species of the *caecus* group this is better developed than in other Trichobiinae.

Trichobius caecus group

Trichobius caecus Edwards

Trichobius caecus Edwards, 1918:424.—Wenzel, Tipton and Kiewliez, 1966:450 Fig. 55B, 57A-C.

Venezuelan Survey Records (801 males, 788 females, 2 sex undet.)

APURE: 1 male and 2 females ex *Trachops cirrhosus,* 2 males ex *Macrophyllum macrophyllum,* and 8 males and 10 females ex *Pteronotus parnellii,* 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 24-28-XII-65; 6 males and 4 females, same host, 1 km W Pto. Páez, Cerro de Murcielagos, Pto. Páez, 76 m, 19-I-66.

ARAGUA: 1 male ex 1 *Myotis keaysi*, 13 km NW *Maracay, Rancho Grande Biol. Sta.*, v,JBV m, 5-VIII-65.

BOLÍVAR: 4 males and 4 females ex 1 *Anoura geoffroyi*, 16 males and 19 females ex *Pteronotus parnellii*, 20 km W La Paragua, Hato San José, 306 m, 10-IV-67; 2 males and 1 female ex 1 *Artibeus fuliginosus*, 1 female ex *Artibeus lituratus*, 28 males and 24 females ex *Pteronotus parnellii*, 28 km SE El Manteco, Los Patos, 150-350 m, 11-IV-66; 2 males and 3 females, same host, 56 km SE El Dorado, km 67, El Manaco, 150 m, 16-VI-66; 28 males and 11 females, same host, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 13-23-VI-66; 98 males and 76 females, same host, 5 km NNW Guasipati, Guasipati, 190 m, 29-IV-66; 284 males and 341 females, same host, 47 km ESE Caicara, Hato La Florida, 50 m, 19-IV–5-V-67; 1 male, same host, 21 km NE Icabarú, Icabarú, 750 m, 11-V-68; 4 males and 4 females, same host, 85 km SSE El Dorado, km 125, 882-1,032 m, 11-16-V-66; 15 males and 7 females, same host, 50 km SE El Manteco, Río Supamo, 150 m, 10-IV-66.

CARABOBO: 1 male ex *Pteronotus parnellii*, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 29-XI-67; 6 males and 4 females, same host, 6 km N Urama, Urama, 60 m, 17-III-66.

DTO. FEDERAL: 6 males and 11 females ex *Pteronotus parnellii* nr. El Limón, 48 km W Caracas, Hda. Carapiche, 398 m, 20-VIII-66; 2 males, same host, 4 km NNW Caracas, Los Venados, 1,513 m, 22-VII-65.

FALCÓN: 3 males and 2 females ex 5 *Leptonycteris curasoae*, 1 male and 2 females ex 2 *Mormoops megalophylla*, 7 males and 3 females ex *Pteronotus davyi*, 3 males and 5 females ex *Pteronotus parnellii*, 7 km W Pueblo Nuevo, Cueva del Guano, Península de Paraguaná, 120 m, 10-31-VII-68; 1 female ex 1 *Artibeus jamaicensis*, 19 males and 11 females ex *Pteronotus parnellii*, 16 km ENE Mirimire, nr. La Pastora, 70 m, 28-30-XI-67; 1 female ex 1 *Carollia perspicillata*, 24 males and 34 females ex *Pteronotus parnellii*, 1 female ex *Trachops cirrhosus*, 19 km NW Urama, Km 40, Urama, 25 m, 15-27-X-65.

GUÁRICO: 8 males and 8 females ex *Pteronotus parnellii*, 10 km NE Altagracia, Hda. El Vira, 630 m, 16-IX-66.

LARA: 8 males, 2 females, and 1 sex undet. ex *Pteronotus parnellii*, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 521-528 m, 14-17-VII-68.

MIRANDA: 1 female ex *Artibeus lituratus*, 1 km S Río Chico, 1 m, 24-X-66; 3 males and 1 female ex *Pteronotus parnellii*, 1 km E Río Chico, 1 m, 21-XI-66; 2 males, same host, 4 km SW Birongo, Cueva Walter Dupouy, Birongo, 195 m, 28-I-68; 3 males and 2 females, same host, Birongo, 60 m, 22-23-I-68; 2 males, same host, 5 km NNW Guarenas, Curupao, 1,160 m, 10-X-66; 2 males and 1 female, same host, 16 km SSE Caracas, San Andres, 950 m, 30-XII-65.

MONAGAS: 1 sex undet. ex *Desmodus rotundus*, 3 km SW Caripe, 854 m, 13-VII-67; 1 male ex 1 *Oryzomys fulvescens*, 5 km NW Caripe, San Agustín, 1,150 m, 28-VI-67.

SUCRE: 1 male and 1 female ex *Pteronotus parnellii*, 10 km NE Güiria, Ensenada Cauranta, 90 m, 7-VI-67; 2 males, same host, 9 km NE Güiria, Ensenada Cauranta, 1 m, 3-VI-67.

T. F. AMAZONAS: 2 females ex 1 *Uroderma bilobatum*, 5 males and 7 females ex *Pteronotus parnellii*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 10-I–9-II-67; 1 male ex 1 *Rhynchonycteris naso*, 68 males and 82 females ex *Pteronotus parnellii*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-11-IV-67; 1 male and 1 female ex *Desmodus rotundus*, 10 males and 9 females ex *Pteronotus parnellii*, Río Orinoco, Tamatama, 135 m, 27-IV–7-V-67; 3 males and 4 females, same host, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 3-II-67; 33 males and 39 females, same host, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 17-24-III-67; 6 males and 4 females, same host, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 7-IX–2-X-67; 22 males and 13 females, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 5-27-VII-67.

YARACUY: 1 male ex *Pteronotus davyi*, 36 males, 23 females, and 1 sex undet. ex *Pteronotus parnellii*, 20 km NW San Felipe, Minas de Aroa, 380-400 m, 6-19-XII-67; 3 males, same host, 10 km NW Urama, El Central, Urama, 25 m, 8-III-66; 10 males and 8 females, same host, 11 km NW Urama, El Central, Urama, 25 m, 14-15-III-66.

OTHER VENEZUELAN MATERIAL EXAMINED

ARAGUA: 6 males and 4 females ex "*Chilonycteris rubiginosa*" (= *Pteronotus parnellii*), Rancho Grande (El Limón), 30-III-60, C. O. Handley, Jr.; 8 males and 11 females ex "*Enchisthenes hartii*" (= *Artibeus hartii*), same locality except 29-VIII-62, J. V. Scorza, C. and A. J. Machado.

BOLÍVAR: 2 males and 3 females ex "*Chilonycteris rubiginosa*," Serrania de Nuria, 31-VII-62, J. Ojasti.

MIRANDA: 1 male and 3 females ex *Carollia* sp., Alfredo Jahn Cave, 7-V-61, J. Racenis, J. Ojasti, C. Bordon; 1 male and 1 female, same host and locality, 16-IV-61, C. Bordon.

Host Associations

Of 1,592 specimens of *Trichobius caecus* collected by the survey teams, 1,548 (97 percent) were from 216 *Pteronotus parnellii*, the remaining 44 specimens were from 31 individuals of 13 other hosts. Most of these other records probably represent transitory occurrences on other cave bats with which the characteristic host, *Pteronotus parnellii*, is associated. Some are probably disturbance transfers; a few are clearly contaminants (e.g., a single specimen [not recorded above] was reported from a rodent, *Oryzomys fulvescens*). The record from *Artibeus* (= *Enchisthenes*) *hartii*; is dubius.

Remarks

I have assigned all of the above specimens to *T. caecus*. I did not find any in the collection that I could refer to *T. yunkeri*. They exhibit sufficient variation in the chaetotaxy of the female terminal cone and seventh sternites that the differences between *yunkeri* and *caecus* that were cited and illustrated by Wenzel et al. (loc. cit.) do not appear to be useful in separating these species. A detailed analysis may show statistically significant differences. The male postgonites and the female subgenital sclerite do differ (Fig. 16), but these differences could be clinal. When adequate material from Colombia becomes available, it will be interesting to see if they correlate with the distributions of the subspecies of the characteristic host, *Pteronotus parnellii*.

A "*habitus*" figure of *T. yunkeri* (Fig. 13B) is included to facilitate recognition of species of the *caecus* group.

Trichobius johnsonae Wenzel

(Fig. 14A, 16G-I)

Trichobius johnsonae Wenzel, 1966:455, Fig. 55A, 57G-I.

Venezuelan Survey Records (30 males, 7 females)

BOLÍVAR: 2 females ex *Pteronotus personatus*, 28 km SE El Manteco, Los Patos, 150 m, 11-IV-66.

DTO. FEDERAL: I male ex *Pteronotus davyi*, nr. El Limón, 48 km W Caracas, Hda. Carapiche, 380 m, 21-VIII-66.

SUCRE: I male ex *Pteronotus davyi*, 26 km ESE Carúpano, Manacal, 400 m, 16-XII-67.

YARACUY: 10 males and 1 female ex *Pteronotus davyi*, 1 male ex *Pteronotus personatus*, 17 males and 3 females ex *Pteronotus suapurensis*, 20 km NW San Felipe, Minas de Aroa, 385-400 m, 7-23-XII-67; I female ex *Noctilio labialis*, 10 km NW Urama, El Central, Urama, 25 m, 8-III-66.

Other Venezuelan Specimens Examined

ARAGUA: 2 males and 3 females ex *Pteronotus suapurensis*, Rancho Grande (El Limón), 30-III-60, C. O. Handley, Jr.

Host Associations

Of 37 specimens of *T. johnsonae* collected by the survey teams, 20 (54 percent) were from 15 *Pteronotus suapurensis*, 13 (35 percent) ex 10 *P. davyi*, and 3 ex 2 *P. personatus*. The remaining record, from *Noctilio labialis*, probably represents a transitory transfer or contamination. The host associations and geographic distribution of this fly appear to parallel those of *Nycterophilia fairchildi* (q.v.).

Trichobius bilobus, new species

(Fig. 14C, 15)

A member of the *caecus* group, thus with 1-faceted eyes, bifurcate median mesonotal suture, and rather evenly setose mesonotum, the setae moderately long and slightly denser and shorter in the medial discal area of prescutum in front of the antescutellar suture; entire mesonotum covered with microtrichiae. Female. Posterolateral margins of lateral lobes of tergum 1+2 emarginate, bilobed. Tergum 7 not clearly differentiated from the supra-anal plate, the two forming a rather large terminal cone; with 19 setae on basal portion, rather than 2-4 setae as usual, and 5 rather than 3 microsetae along distal margin of supra-anal plate. Male. Postgonites similar to those of *johnsonae*, in that the ventral macroseta and accessory setae are inserted close together, but more nearly resembling those of *caecus* in general shape, and differing in being much more evenly curved (both dorsal and ventral margins).

Description

Virtually identical to *Trichobius johnsonae*, *caecus*, and *yunkeri* except as follows: *Abdomen*. Female. Lateral lobes of tergum 1+2 (Fig. 14C), with posterolateral margin emarginate, bilobed, with 22-25 bristles, half or more of these stronger and longer than the others. Basal portion (tergum 7) of terminal cone (Fig. 15A) with 19 setae (9-10 on each side), including 6 macrosetae, 4 of these of about equal length, 2 about two-thirds the length of the others, and the rest shorter, of varying lengths; apical portion (supra-anal plate) with 5 submarginal macrosetae, the 3 median ones about half again as long as the 2 lateral ones, anterior to these (on one

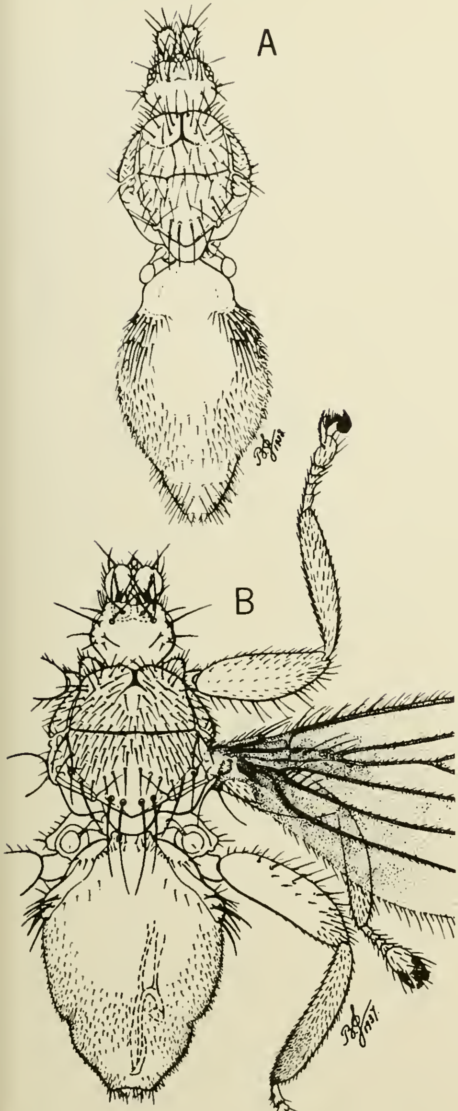

Fig. 13. A, *Trichobius pallidus* Curran, male: dorsal view. B, *Trichobius yunkeri* Wenzel, male: dorsal view. From Jobling (1938; B, as *Trichobius caecus* Edwards).

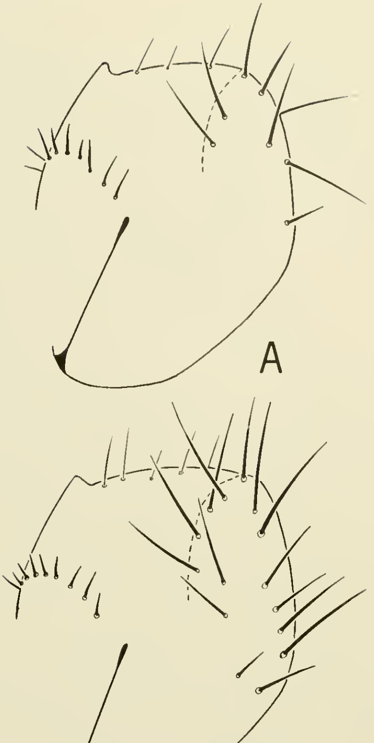

Fig. 14. Lateral lobes of tergum 1+2: A. *Trichobius johnsonae* Wenzel; B. *Trichobius caecus* Edwards; C, *Trichobius bilobus*, new species, female. A-B from Wenzel et al. (1966).

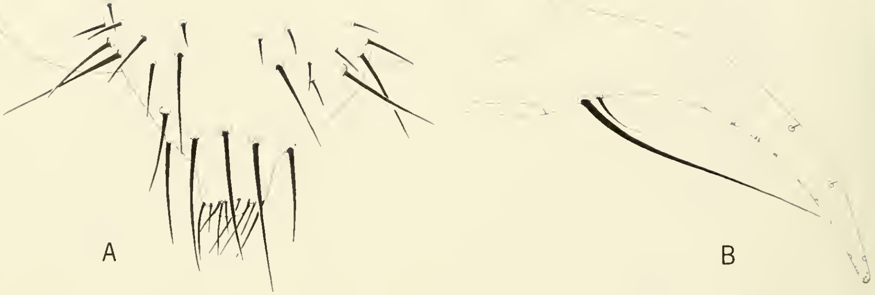

Fig. 15. *Trichobius bilobus*, new species: A, apex of abdomen, female holotype; B. left postgonite, male allotype.

side only in the type) a single large seta about half the length of the macrosetae. Seventh sternites with 8 longer bristles near apical margin, 2 of these macrosetae that are as long as each sternite is wide, 3 that are half as long or slightly longer, and 3 mesal, much shorter setae, these less than half as long as the longest macrosetae; anterior to these is a series of much shorter setae, the rest of the surface with numerous microsetae. Male. Postgonites rather stout, both dorsal and ventral margins broadly, evenly arcuate; sides with 2 microsetae, ventral margin and apex with numerous sensillae; ventral macroseta very long, extending to near apex, accessory seta inserted very close to macroseta.

Measurements

	Males	Females
BL	1.67	2.44
TL	0.54-0.56	0.74
WL	1.36-1.65	1.85
WW	0.67-0.80	0.79

Type Data: Female holotype and male allotype (USNM), 1 male paratype (IZUCV) ex *Pteronotus suapurensis* (SVP 2881), Venezuela, Trujillo, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 14-IX-65.

Other Venezuelan Material Examined

YARACUY: 1 female ex *Pteronotus suapurensis*, 20 km NW San Felipe, Minas de Aroa, 395 m, 16-XII-67 (specimen destroyed during preparation).

Remarks

The illustration of the side view of the lateral lobes of tergum 2 is reconstructed from preliminary sketches and cannot be regarded as entirely accurate, but it does show the emargination and the general chaetotaxy. The alcohol-preserved female noted above had been set aside for illustration in glycerin because the side view could not be made from the other specimens, which were mounted in balsam in the conventional manner. Unfortunately, this specimen was inadvertently destroyed during treatment in caustic. Thus, it was impossible to draw the female "subgenital plate" either, though in the holotype female (on slide) it appears broad as in *yunkeri* and *caecus* and in no way resembles that of *johnsonae*.

Trichobius galei Wenzel
(Fig. 16J-L)

Trichobius galei Wenzel, 1966:449, Fig. 54, 57J-L
Trichobius caecus, authors (part), not Edwards

Venezuelan Survey Records (179 males, 95 females, 3 sex undet.)

BOLÍVAR: 17 males, 12 females, and 1 sex undet. ex *Natalus tumidirostris*, 47 km ESE Caicara, Hato La Florida, 50 m, 19-24-IV-67.

FALCÓN: 1 male ex 1 *Leptonycteris curasoae*, 3 males ex *Pteronotus davyi*, 18 males and 7 females ex *Natalus tumidirostris*, 7 km W Pueblo Nuevo, Cueva del Guano, Península de Paraguaná, 120 m, 22-31-VII-68; 1 male and 2 females, same host, 11 km ENE Mirimire, nr. La Pastora, 250 m, 21-XI-67.

LARA: 6 males and 7 females ex *Natalus tumidirostris*, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 521 m, 17-VII-68.

MIRANDA: 37 males, 27 females, and 2 sex undet. ex *Natalus tumidirostris*, 15 km SE Caracas, Cueva Ricardo Zuloaga, El Encantado, 548 m, 14-I-68; 96 males and 40 females, same host, 15 km SE Caracas, Cueva Ricardo Zuloaga, nr. El Encantado, 548 m, 9-I-66.

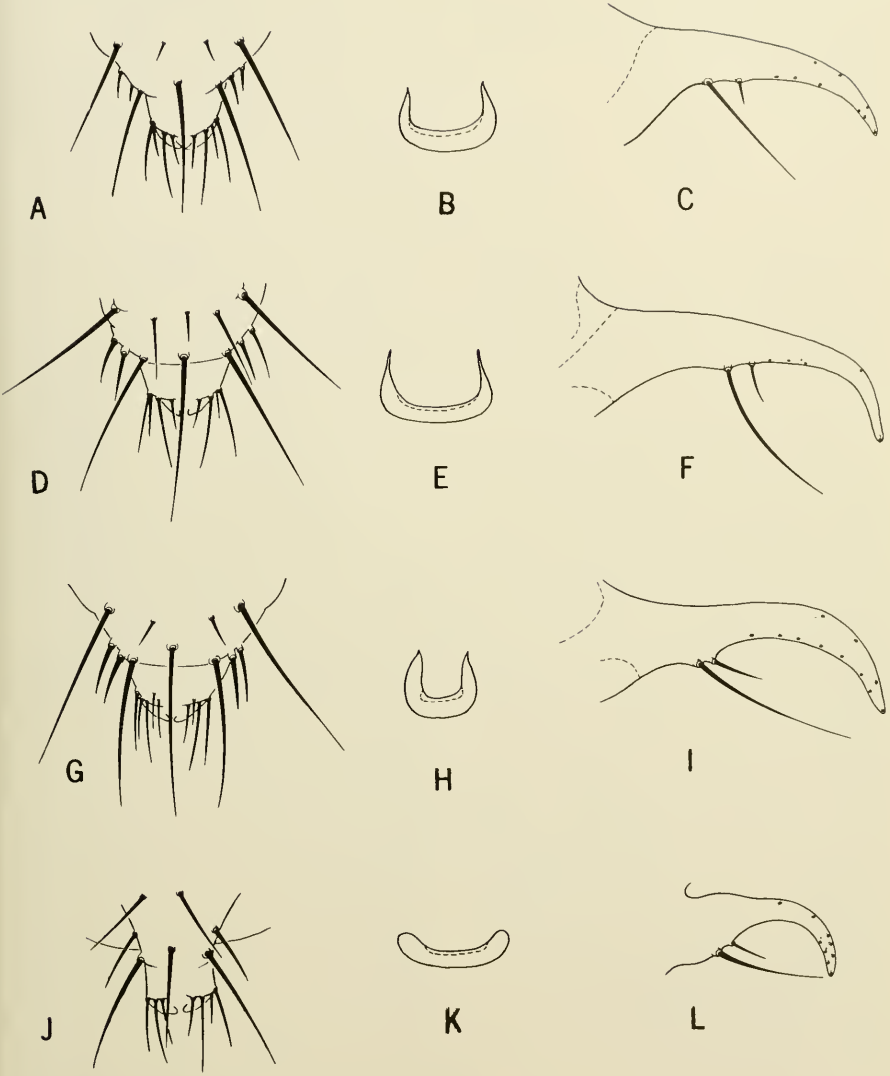

Fig. 16. Terminalia, *Trichobius caecus* group, including (from left to right) female terminal cone, female postgenital sclerite, and lateral view of male left postgonite: A-C, *Trichobius caecus* Edwards; D-F, *Trichobius yunkeri* Wenzel; G-I. *Trichobius johnsonae* Wenzel; J-L, *Trichobius galei* Wenzel. From Wenzel et al. (1966).

Other Venezuelan Specimens Examined

ARAGUA: 2 males ex *Natalus tumidirostris*, Rancho Grande, 17-19-VIII-49, J. Racenis.

MIRANDA: 137 males and 78 females ex *Natalus tumidirostris*, nr. Encantado, Cueva Ricardo Zuloaga, 29-IV-62, C. Bordon.

Measurements

	Males	Females
BL	1.15	1.53-1.56
TL	0.40-0.41	0.48-0.52
WL	1.06-1.14	1.31-1.41
WW	0.51-0.54	0.60-0.63

Host Associations

Of 277 specimens of *T. galei* collected by the survey teams, 273 (98.5 percent) were taken from 73 *Natalus tumidirostris*. The remaining 4 specimens were from 2 *Pteronotus davyi* and 1 *Leptonycteris curasoae*, both cave bats like the principal host.

Remarks

Specimens of *T. galei* collected from *Natalus tumidirostris* at the Miranda locality show distinctive differences in the number of setae on the scutum, compared with those from Panama and Colombia. For example, typical *galei* from *Natalus stramineus mexicanus* in Panama have only two rows of smaller setae (plus the antescutellars) at midline in front of the scutellum, and counts of scutal setae, including the macrosetae along lateral margins, ranged from 42-48 in the males and 41-47 in the females. In the Miranda population, on the other hand, there are usually three confused rows of setae at midline, plus the antescutellars, and counts of scutal setae range from 56-61 in males and 61-69 in females. The allopatry and alloxeny between Panamanian and Miranda populations, if considered by themselves, suggest that two distinct species are represented. However, the specimens from Falcón (Cueva del Guano), from *N. tumidirostris*, more nearly resemble *galei* in possessing only two rows of scutal setae along midline in front of the antescutellars, and, in the few slide specimens for which counts were made, the total number of setae range between 48-51 in the males. In view of this, and because these populations show no differences in the female subgenital sclerite and the male postgonites, I tentatively regard them as a single species which exhibits geographic differences in number of scutal setae.

Trichobius major group

I believe the diagnosis (Wenzel et al. 1966, p. 457) of the *Trichobius major* group should be broadened to include a number of species in which sternum 6 is present in the males, e.g., *T. longipilis* n. sp., *T. leionotus* n. sp., *T. parasparsus* n. sp., *T. robynae* Peterson and Hurka, and *T. cernyi* Peterson and Hurka.

In *T. longipilis* n. sp., the laterovertices and occipital lobes are better defined than in other members of the group, but the structure of the metasternal lobe, of male sternum 5, and of the postgonites indicate that it is best placed in this group.

Trichobius sparsus Kessel

(Fig. 5, 17)

Trichobius sparsus Kessel, 1925:17, Pl. 1, Fig. 7; Pl. 2, Fig. 10—Wenzel, Tipton, and Kiewlicz, 1966:457, Fig. 42, 58.

Venezuelan Survey Records (53 males, 59 females)

BOLÍVAR: 1 male ex 1 *Natalus tumidirostris*, 13 males and 11 females ex *Pteronotus parnellii*, 47 km ESE Caicara, Hato La Florida, 50 m, 19-24-IV-67; 2 males and 3 females, same host, 56 km SE El Dorado, km 67, El Manaco, 150 m, 16-VI-66; 6 males and 3 females, same host, 59 km SE El Dorado, km 74, El Manaco, 150 m, 13-23-VI-66; 2 males and 1 female, same host, 5 km NNW Guasipati, Guasipati, 190 m, 29-IV-66; 8 males and 8 females, same host, 20 km W La Paragua, Hato San José, 306 m, 10-IV-67; 1 male, same host, 85 km SSE El Dorado, Km 125, 1,032 m, 11-V-66; 6 males and 12 females, same host, 28 km SE El Manteco, Los Patos, 150-350 m, 11-IV-66; 2 males and 4 females, same host, 50 km SE El Manteco, Río Supamo, 150 m, 8-10-IV-66.

GUÁRICO: 1 female ex *Pteronotus parnellii*, 10 km NE Altagracia, Hda. Elvira, 630 m, 16-IX-66.

LARA: 2 females ex *Pteronotus parnellii*, 10 km NE El Tocuyo, Caserio Boro, El Tocuyo, 528 m, 14-VII-68.

MIRANDA: 1 male and 1 female ex *Pteronotus parnellii*, 4 km SW Birongo, Cueva Walter Dupouy, Birongo, 195 m, 28-I-68; 4 males and 4 females, same host, Birongo, 60 m, 22-23-I-68; 1 male, same host, 5 km NNW Guarenas, Curupao, 1,160 m, 6-X-66.

T. F. AMAZONAS: 1 male ex *Pteronotus parnellii*, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 17-III-67; 1 male, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-IV-67; 4 males and 9 females, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 5-25-VII-67.

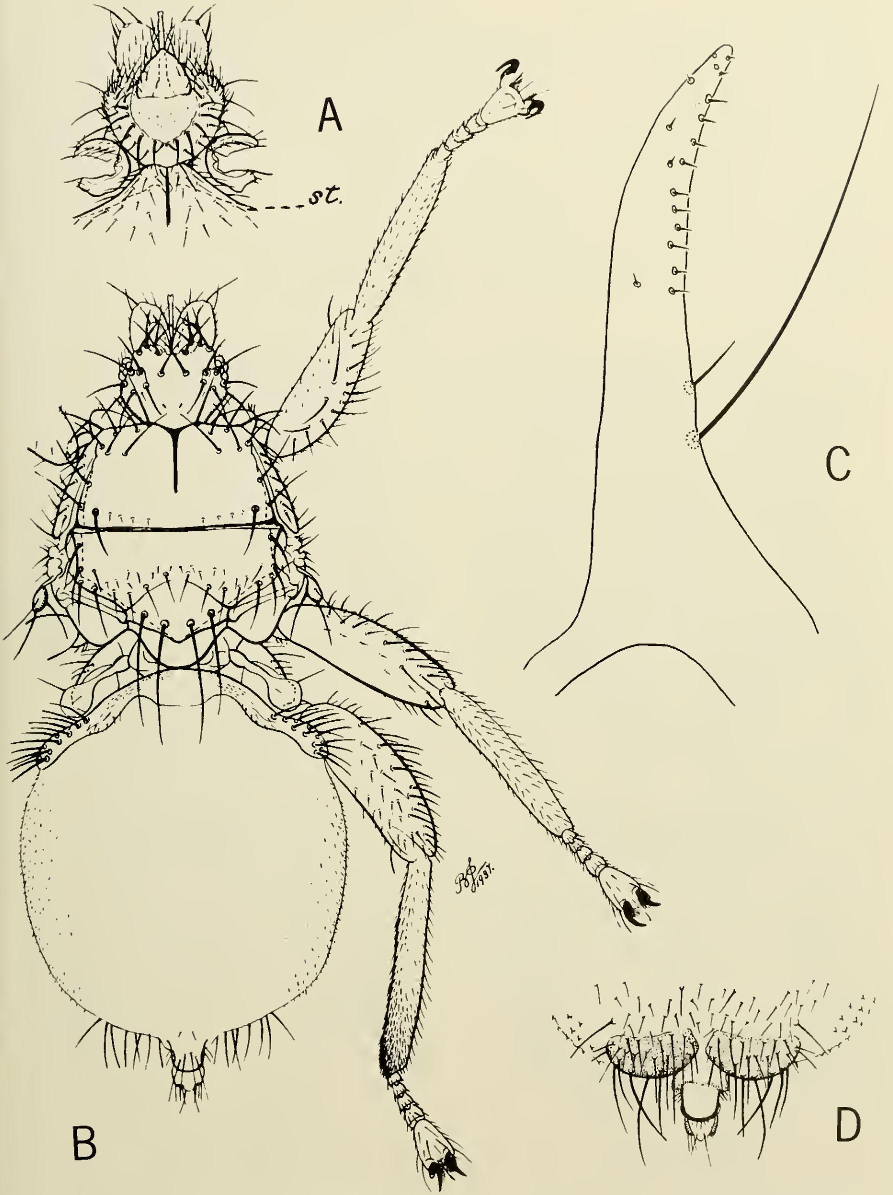

Fig. 17. *Trichobius sparsus* Kessel, female: A, underside of head and anterior part of thorax; B, dorsal view, female; C, left postgonite, male; D, apex of venter, female abdomen. A, B, D from Jobling (1938). C, from Wenzel et al. (1966).

HOST ASSOCIATIONS

All but 1 of the 112 specimens of *T. sparsus* collected by the survey teams in Venezuela were from *Pteronotus parnellii*, the host of Kessel's type specimen.

Trichobius parasparsus, new species
(Fig. 18B, 19B)

Trichobius parasparsus superficially closely resembles *T. sparsus* Kessel, and the West Indian species *T. cernyi* and *T. robynae*, recently described by Peterson and Hurka (1974). However, *parasparsus* females possess a very large tergum 7, which is normally continuous with the broad supra-anal plate, and both of these are wider than the proctiger—the supra-anal plate conspicuously so—and the ventral arc is very broad with conspicuous lateral flanges. In the three other species, tergum 7 is very small and inconspicuous (sometimes scarcely discernable even in alcohol-preserved specimens), conspicuously narrower than the proctiger, and separated from the supra-anal plate—which is scarcely if at all wider than the proctiger—and the ventral arc lacks conspicuous lateral flanges. Also, in *cernyi* there are only 3 terminal macrosetae on the supra-anal plate (4 in the other species). Males of *parasparsus* agree with those of *robynae* and *cernyi* in that sternum 5 is absent (not sclerotized) and sternum 6 is present, while the

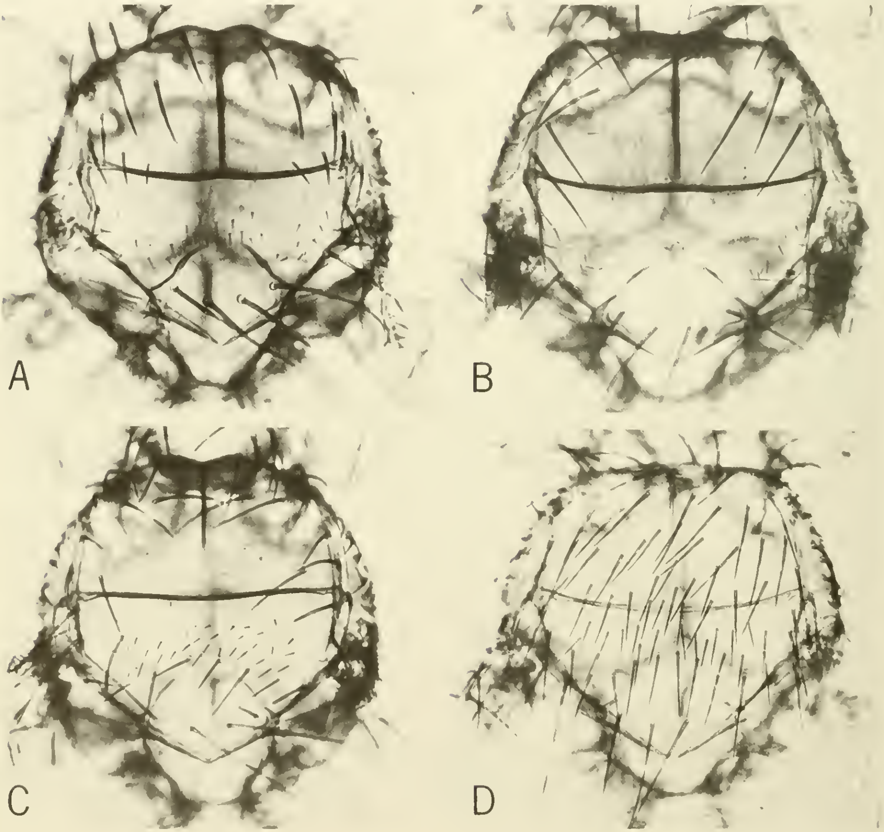

Fig. 18. Thorax, dorsal view, of species of *Trichobius major* group: A, *Trichobius leionotus*, new species, male (SVP 12686); B, *Trichobius sphaeronotus* Jobling, female (SVP 44423); C, *Trichobius parasparsus*, new species (female allotype); D, *Trichobius longipilis*, new species, female (SVP 43226).

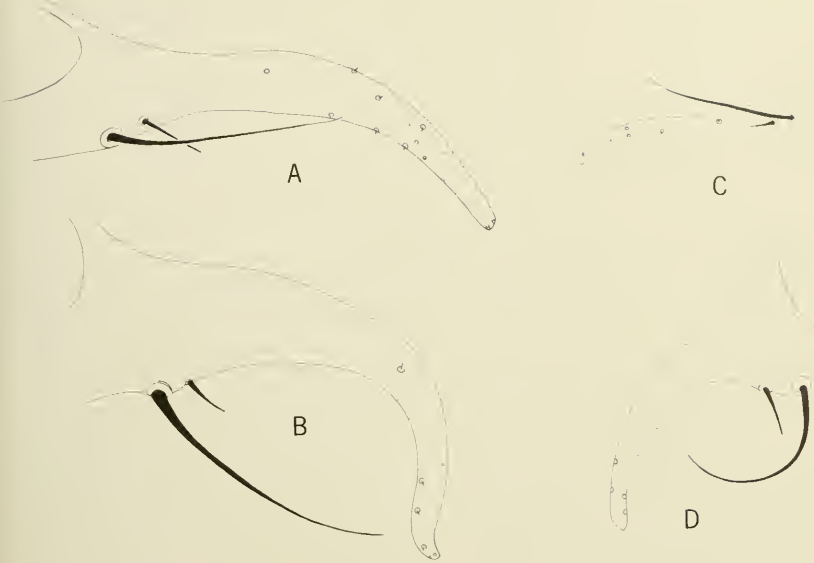

Fig. 19. Postgonites, *Trichobius major* group: A, *Trichobius sphaeronotus* Jobling (SVP 44423): B, *Trichobius parasparsus,* new species (SVP 6026); C, *Trichobius longipilis,* new species (holotype); D, *Trichobius leionotus,* new species (SVP 20461).

reverse is true of *sparsus.* However, *parasparsus* males may be recognized by the strongly curved postgonites, which are nearly straight or feebly curved in *sparsus* and *robynae* and moderately curved in *cernyi.* Further, *T. parasparsus,* like *sparsus* and *cernyi* differs from *robynae* in that the transverse row of microsetae on the prescutum near the transverse suture is broadly interrupted. This row is complete in *robynae.* However, in some individuals of both *sparsus* and *parasparsus,* an additional prescutal microseta may be located on each side of midline, and, when this is true, the transverse row may superficially appear to be complete.

Description

Head. As in *T. sparsus. Thorax.* Scutum with at least 2 rows of short setae at middle immediately in front of the antescutellars; microtrichia present along sides only (throughout setose area in *sparsus*), these lacking on scutellum (present on anterior half in *sparsus*). Anterior margin of mesosternum feebly rounded (feebly but distinctly emarginate in *sparsus*). *Abdomen.* Female. Tergum 7 large, distinctly wider than proctiger, usually about twice as long as broad, variable in shape, either parallel sided, elliptical, or pear shaped, usually connected with the supra-anal plate, and with 2 pairs of rather short setae, the anterior pair longer, situated just distal to midlength; supra-anal plate with 4 macrosetae in a transverse row (middle pair displaced anteriorly in *sparsus*) and with a row of 4 very short, rather evenly separated setae along basal margin, and an additional stronger seta on each lateral margin (a widely separated pair of short setae on each side along basal margin, the outer seta of each pair stronger, in *sparsus*). Seventh sternites small, each about as wide as ventral arc (twice as wide as arc in *sparsus*) with about 18-20 setae (25-30 in *sparsus*), including 4-5 macrosetae (9-10 in *sparsus*), the rest shorter. Ventral arc with conspicuous lateral lobelike flanges.

Male. Sternum 5 absent, 6 well developed. Postgonites (Fig. 19B) strongly curved, almost hooklike, slightly recurved at apex; ventral macroseta inserted basally, the very short accessory seta inserted distal to it along ventral margin; other setae very short. Other characters as in *T. sparsus.*

Measurements

	Males	Females
BL	1.65-1.88	1.88-2.13
TL	0.63-0.66	0.69-0.71
WL	1.51-1.65	1.72-1.77
WW	0.74-0.81	0.81-0.87

Type Data: Male holotype and female allotype ex *Pteronotus parnellii* (SVP 9390), Venezuela, Bolívar, 59 km SE El Dorado, Km74, El Manaco, 150 m, 14-VI-66.

Paratypes—Apure: 1 male and 3 females ex *Pteronotus parnellii*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 24-28-XII-65; 1 male and 1 female, same host, 1 km W Pto. Páez, Cerro de Murcielagos, Pto. Páez, 76 m, 19-I-66.

Bolívar: 1 male and 3 females ex *Pteronotus parnellii*, 56 km SE El Dorado, Km 67, El Manaco, 150 m, 16-VI-66; 1 male and 3 females, same host, same locality data as the holotype except for 13-14-VI-66; 2 males and 3 females, same host, 5 km NNW Guasipati, Guasipati, 190 m, 29-IV-66; 1 male, same host, 20 km W La Paragua, Hato San José, 306 m, 10-IV-67; 3 males and 6 females, same host, 85 km SSE El Dorado, Km 125, 882-1,032 m, 11-16-V-66; 1 female, same host, 28 km SE El Manteco, Los Patos, 350 m, 11-IV-66; 2 males, same host, 50 km SE El Manteco, Río Supamo, 150 m, 8-10-IV-66.

Falcón: 1 male ex *Sturnira lilium*, 2 males and 2 females ex *Pteronotus parnellii*, 19 km NW Urama, Km 40, Urama, 25 m, 15-27-X-65; 9 males and 5 females, same host, 14 km ENE Mirimire, nr. La Pastora, 60 m, 23-XI-67; 2 females, same host, 16 km ENE Mirimire, nr. La Pastora, 70 m, 28-XI-67.

T. F. Amazonas: 1 male ex *Sturnira lilium*, 1 male ex 1 *Sturnira tildae*, 1 female ex 1 *Uroderma bilobatum*, 1 male and 1 female ex 2 *Carollia perspicillata*, 20 males and 15 females ex *Pteronotus parnellii*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 3-I—9-II-67; 5 males and 6 females, same host, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 3-II-67; 4 males and 6 females, same host, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 17-24-III-67; 25 males and 15 females, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-11-IV-67; 14 males and 17 females, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 12-27-VII-67; 1 male and 1 female, same host, Río Orinoco, Tamatama, 135 m, 27-IV-67.

YARACUY: 1 male and 1 female ex *Pteronotus parnellii*, 20 km NW San Felipe, Minas de Aroa, 385-395 m, 14-19-XII-67.

Host Associations

Of 191 specimens of *T. parasparsus* collected by the survey teams in Venezuela, 185 (97 percent) were from 63 *Pteronotus parnellii*. The other 6 specimens, from 4 hosts, almost certainly represent transitory transfers and/or contaminations. The characteristic host is clearly *P. parnellii*, on which *parasparsus* occurs together with *T. sparsus*.

Remarks

Interestingly, a very similar species has been taken in Guatemala on *P. davyi*, *Mormoops m. megalophylla*, *Balantiopteryx io*, and *Natalus stramineus*, but not on *P. parnellii*, though *T. sparsus* was taken from that host at another locality.

Trichobius sphaeronotus Jobling

(Fig. 1A-C; 3A, C; 6A, B; 19A, 18B)

Trichobius sphaeronotus Jobling, 1939a:494, Fig. 4A-C.

Venezuelan Survey Records (320 males, 309 females, 13 sex undet.)

FALCÓN: 1 male and 1 female ex *Glossophaga longirostris*, 1 male and 2 females ex *Leptonycteris curasoae*, Capatárida, 40-55 m, 24-VI—14-VII-68; 7 males and 13 females, same host, 25 km SW Pueblo Nuevo, Yabuquiva, Península de Paraguaná, 13 m, 17-18-VII-68; 9 males and 9 females, same host, 7 km W Pueblo, Nuevo, Cueva del Guano, Península de Paraguaná, 120 m, 10-11-VII-68.

GUAJIRA: 1 male ex *Leptonycteris curasoae*, 37 km NNE Paraguaipoa, nr. Cojoro, 15 m, 28-VI-68.

LARA: 2 females ex 2 *Pteronotus parnellii*, 1 male ex *Glossophaga longirostris*, 2 males and 3 females ex *Rhogeessa minutilla*, 267 males, 246 females, and 13 sex undet. ex *Leptonycteris curasoae*, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 528 m, 14-16-VII-68; 3 males and 1 female, same host, 47 km NE El Tocuyo, La Concordia, El Tocuyo, 592 m, 23-24-VII-68.

NUEVA ESPARTA: 6 males and 4 females ex *Leptonycteris curasoae*, 3 km NE La Asunción, Isla Margarita, 305 m, 20-I-67; 4 males and 8 females, same host, 3 km S La Asunción, Isla Margarita, 53 m, 21-I—7-II-67.

SUCRE: 1 male ex *Leptonycteris curasoae*, 16 km E Cumaná, 1 m, 21-XII-66.

ZULIA: 7 males and 15 females ex *Leptonycteris curasoae*, 35 km NNE Paraguaipoa, nr. Cojoro, 5-15 m, 20-VI—1-VII-68; 10 males and 5 females, same host, 36 km NNE Paraguaipoa, nr. Cojoro, 15 m, 30-VI–1-VII-68.

MEASUREMENTS

	Males (5)	Females (4)
BL	1.66-1.78	1.78-2.40
TL	0.60-0.63	0.66-0.70
WL	1.58-1.62	1.61-1.90
WW	0.73-0.87	0.83-0.87

HOST ASSOCIATIONS AND DISTRIBUTION

Of 630 specimens of *Trichobius sphaeronotus* collected by the survey teams, 619 (96.6 percent) were from 152 *Leptonycteris curasoae*. The other 11 specimens probably represent transitory transfers or contaminations that occurred in the collecting.

As in the case of *Nycterophilia coxata*, *T. sphaeronotus* exhibits a disjunct distribution between Mexico and South America that appears to correlate with the distribution of the host genus *Leptonycteris*. It should be noted that all published records of *T. sphaeronotus* from *Leptonycteris* give *L. nivalis* as the host. The type (Mexico: Nuevo Leon; San Luis Potosi) is probably from that host, as are specimens recorded from Texas. However, the specimens recorded from New Mexico and Arizona are probably from *Leptonycteris sanborni*. I have examined specimens from both *nivalis* and *sanborni*, including several dozen specimens of the series from which Jobling described *sphaeronotus*, and find no differences between them, though the two hosts appear to be adapted to different biotopes (Baker and Cockrum, 1966).

REMARKS

As is true for *Nycterophilia coxata*, there are slight differences between the North American and Venezuelan populations of *T. sphaeronotus*. The number of scutal setae in the W-shaped antescutellar row range from 28-32, with an average of 30.75 in Venezuelan specimens and from 24-31 in North American specimens, with an average of 25. Further, in North American specimens there is a very strong seta at each basal angle of the W of this row; this seta is usually about half as long as the macroseta immediately lateral to it. In the Venezuelan specimens, this seta is sometimes slightly stronger than but usually of about the same size as the minute setae of the W-shaped row.

One may argue that the North and South American population represent distinct species, but until further information indicates otherwise, I consider them to be geographic disjuncts of the same species.

Trichobius leionotus, new species

(Fig. 18A, 19D)

Trichobius n. sp., Whitaker and Easterla, 1975: 243:244

Superficially resembling *sphaeronotus* but differing as follows: Size smaller. Thorax narrower, subglobose, about as wide as deep (wider than deep in *sphaeronotus*), anterior margin distinctly produced and bilobed at middle (subtruncate or feebly produced in *sphaeronotus*); prescutum with 18 macrosetae rather than 14, including 2 on each side anterior to transverse suture (these 2 are microsetae in *sphaeronotus*); scutum with a double rather than a single W-shaped row of very short antescutellar setae. Femora more densely setose above. FEMALE. Seventh sternites small, rather evenly oval, setose throughout, the setae mostly fine and short, without a conspicuous bare area (larger, inner posterior margins strongly oblique and bare, setae strong, none very short, in *sphaeronotus*). MALE. Sternum 5 divided into 2 sternites (complete, though apical margin may be emarginate and midline impressed in *sphaeronotus*). Postgonites strongly curved from base, hooklike, at right angles to hypandrium (distally curved but not hooklike in *sphaeronotus*); aedeagus strongly troughlike except distally (not so in *sphaeronotus*).

DESCRIPTION

Head. Eyes with 7-8 facets. Laterovertices and occipital lobes not clearly defined, the lobes each with about 7 strong setae, and 2 minute ones along posterior margin. Palpi as in *T. sphaeronotus*.

Thorax. Light yellow, "subglobose," about as wide as deep, distally convex. Mesonotum with rather deep longitudinal and transverse integumental striations; median and transverse sutures united; prescutum with 18 macrosetae, 2 of these on each side near lateral margin anterior to transverse suture; scutum with an irregularly double W-shaped antescutellar row of microsetae and with 4 macrosetae along each lateral margin.

Wings. Very similar to those of *sphaeronotus*. *Legs*. Femora dorsally with more numerous long setae than in *sphaeronotus*.

Abdomen. Lateral lobes of tergum 1 + 2 with ± 17-18 mostly strong setae of varying lengths, several very short and fine. FEMALE. Tergum 7 transverse, typically with 2, rarely 3, pairs of short setae, the posterior pair longer and farther apart; supra-anal plate uniformly sclerotized and pigmented, with 4 fine distal macrosetae, and on each side a row of 3 short discal setae in an oblique row. Seventh sternites rather evenly oval, a little broader than long, without any bare areas, with ± 30 slender setae, mostly short, but including 1-2 macrosetae, the setae becoming shorter anteriorly, those near margin very short. Male. Sternum 5 divided, with longer setae on apical margins, the outer ones longer; sternum 6 almost threadlike and usually inflexed at middle; sternum 7 + 8 with ± 30 fine setae, 1 a macroseta, the dorsal ones longer, the others becoming shorter ventrad. Postgonites strongly curved, hooklike, the ventral accessory seta inserted distal to the macroseta. Aedeagus troughlike except distally.

Measurements

	Males	Females
BL	1.23-1.48	1.56-1.72
TL	0.47-0.52	0.54-0.57
WL	1.32-1.45	1.64-1.69
WW	0.65-0.74	0.80-0.81

Type Data: Male holotype, female allotype, 2 males and 1 female paratype ex *Mormoops megalophylla* (FMNH 64961-83) and 1 male and 1 female paratype ex *Pteronotus davyi fulvus* (FMNH 65140-65), Guatemala, Alta Vera Paz, Lanquin, Cueva de Lanquin, 1,000 m, 31-V-48, Rodger D. Mitchell and Luis de la Torre (FMNH Guatemala Zoological Expedition, 1948). In the collection of Field Museum of Natural History.

Paratypes—ECUADOR. 2 males (CNC) (D.C. ± 5131) ex *Mormoops megalophylla*, Carchi, Gruta Rumichaca, 2 mi E La Paz, 8,700 ft, 4-VII-64, D. C. Carter.

TRINIDAD. 2 males and 5 females (FMNH), "aspirated from wall of a cave," Central Road, Mt. Tamana Cave, 29-VII-67, Johanna Darlington; 11 females (FMNH), same data but from "light trap" in cave. USA. Texas: 1 male and 1 female (FMNH) ex *Mormoops megalophylla*, Uvalde Co., 20 mi N Uvalde, Frio Cave, 24-I-70, Tony Mollhagen.

VENEZUELA. Bolívar: 2 males and 2 females ex *Mormoops megalophylla*, 20 km W La Paragua, Hato San José, 306 m, 10-IV-67; Falcón: 1 male, same host, 7 km W Pueblo Nuevo, Cueva del Guano, Península de Paraguaná, 120 m, 23-VII-68; Sucre: 1 male and 1 female, same host, 10 km NE Güiria, Ensenada Cauranta, 90 m, 7-VI-67; Yaracuy: 6 males and 1 female, same host, 20 km NW San Felipe, Minas de Aroa, 395 m, 11-13-XII-67.

Host Associations

Mormoops megalophylla appears to be the characteristic host of *Trichobius leionotus*.

Remarks

I have seen only 2 specimens from Texas (see above). Whitaker and Easterla (1975:244) reported 159 specimens that are probably this species from 9 *Mormoops megalophylla* at Big Bend National Park, Texas.

Trichobius longipilis, new species

(Fig. 18D. 19C)

Easily distinguished from all other species of *Trichobius* by the following combination of characters: the fairly long, relatively uniform setae of the mesonotum, the very short, pointed metasternal lobe, the undivided female sternum 7, and the divided male sternum 5.

Description

A rather deeply pigmented species. *Head.* Eyes rather prominent but with only 7 facets. Anterior margins of occipital lobes not well defined; laterovertices with 5 strong and 1 short setae; occipital lobes each with 6 strong, long setae—most of them longer than occipital lobes are wide—and 3-4 very short setae along posterior margin of each lobe or just below them. Palpi slightly elongate oval, the apical margins rounded, with strong setae throughout on ventral surface, a shorter seta inserted between the long, ventrally directed seta and the lateral margin. Theca elongate; margins of oral cavity rather strongly convergent.

Thorax. With apical margin subtruncate or feebly arcuate, usually very slightly produced medially, and feebly emarginate at midline; transverse suture usually complete, though sometimes ill defined medially in males; longitudinal suture clearly united with the transverse suture in females, usually indistinct for about a fourth to third of its length anterior to the transverse suture and not united with the transverse suture (or indistinctly so) in the males; prescutum rather evenly setose, all the setae long, those near middle slightly denser and a trifle shorter, about 23-24 setae on each side of median suture; scutum rather evenly covered with setae that are of about the same length as the shorter setae on prescutum except that there are about 4 macrosetae along lateral margin and an antescutellar row of 9-10 longer setae; scutellar setae not conspicuously long. Mesosternum moderately strongly projecting between the front coxae, the ventral margin distinctly, angulately emarginate; metasternal lobe very short, pointed.

Wings. Third cross-vein much closer to second than to first; setae of underside of wing veins mostly limited to apical half of wing, excepting R_1 which is setose for its entire length.

Legs. Profemora rather short, outer face clothed with very short but conspicuous setae; upper surface with shorter setae basally, these becoming longer, stronger and more numerous on distal ⅔, those near apex shorter. Midfemora mostly clothed with short recumbent setae, upper surface with a few conspicuously stronger and longer ones on distal half, shorter again near apex. Hindfemora covered with somewhat longer setae than pro- and midfemora on sides and ventral surface, and with dense, strong setae on dorsal surface, these shorter but conspicuous on about basal third or half and becoming conspicuous macrosetae distally.

Abdomen. Lateral lobes of tergum 1 + 2 with 25-30 strong setae, mostly macrosetae, those along posterior margins of lobe noticeably longer. FEMALE. Lateral abdominal connexivum with minute setae, these somewhat longer ventrally, without a cluster of coarser setae behind lateral lobe of tergum 1 + 2. Tergum 7 transverse, oval, with 2 pairs of widely separated setae arranged in a row, inner pair longer; tergum connected by a narrow sclerotized strap to the rather broad supra-anal plate, which has 4 distal macrosetae and, on each side, a pair of somewhat stronger macrosetae. Sternum 1 + 2 rather uniformly covered with short setae, these mostly slightly longer than the ventral connexival setae and a little longer along posterior margin, especially around posterolateral angles. Sternum 7 not divided into 2 distinct sternites, rather short, except along middle of hind margin which extends posteriorly as a broad short flap that terminates in a sclerotized transverse "bar," this about same width as the ventral arc; sternum slightly indented along anterior margin; surface covered with shorter setae along middle of disc and anterior margin, these becoming very long outwardly where there are 5-6 conspicuous macrosetae on each side; most setae of posterior margins distinctly longer than the discals. MALE. Sternum 5 divided into 2 large transverse sternites; setae along posterior margins of the sternites longer than the discals and becoming at least twice as long toward lateral margins. Sternum 6 present, well defined. Sternum 7 + 8 with ± 11-12 setae, some of them short, most of them of moderate length; tergum 9 with 16-17 setae, these mostly stronger and more conspicuous than those of sternum 7 + 8. Postgonites (Fig. 19C) long slender, evenly curved apically, strongly sinuate above; ventral macroseta inserted far anteriorly (basally), the accessory seta very short, inserted close to and distal to the macroseta; other setae absent, replaced by sensillae.

MEASUREMENTS

	Males	Females
BL	1.61-1.80	1.84-2.08
TL	0.54-0.60	0.65-0.67
WL	1.41-1.59	1.69-1.83
WW	0.58-0.70	0.74-0.84

TYPE DATA: Male holotype and female allotype (SVP 43181) ex *Peropteryx macrotis*, Venezuela, Bolívar, 13 km NE Icabarú, Icabarú, 817 m, 8-V-68. PARATYPES—VENEZUELA. BOLÍVAR: 1 male and 1 female ex *Peropteryx macrotis*, 11 km NE Icabarú, Icabarú, 750 m, 9-V-68; 3 males and 3 females, same host, same data as the holotype; 1 male, same host, 70 km SSE El Dorado, Piedra Virgen, Km 125, 374 m, 29-V-66.

PANAMA. CANAL ZONE: 1 male and 3 females (FMNH), XI-68.

OTHER MATERIAL EXAMINED

PERU. Madre de Dios: 2 badly damaged specimens (FMNH), sex undet., ex *Peropteryx* sp., La Pampa, 23-X-41, C. C. Sanborn.

In addition to these, I have on hand 3 males and 3 females (FMNH) ex *Peropteryx m. macrotis* collected in 1948 at two localities in Guatemala (Escuintla) by Luis de la Torre and Rodger D. Mitchell. I tentatively assign them to *longipilis*, though the discal prescutal and scutal setae appear to be distinctly shorter than in specimens of the type series. The male postgonites appear to be identical.

HOST ASSOCIATIONS

Trichobius longipilis is known only from *Peropteryx* species and is the only species of the genus that is known to parasitize emballonurid bats.

REMARKS

The male sternum 5 and female sternum 7 are very lightly sclerotized and rather difficult to discriminate in alcohol specimens, almost impossible to see in slide preparations. The postgonites of males from *Peropteryx kappleri* appear to be very slightly shorter than those from *P. macrotis*, but I am unable to detect any other differences in specimens from these two hosts.

Trichobius uniformis group

Excepting *Trichobius keenani*, whose characteristic hosts are species of *Micronycteris*, the members of this group parasitize glossophagine bats.

Trichobius keenani Wenzel
(Fig. 21A)

Trichobius keenani Wenzel, 1966:462, Fig. 60A

Venezuelan Survey Records (4 males, 1 female)

APURE: 1 male ex 1 *Carollia perspicillata*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 21-I-68.

BARINAS: 1 male ex *Micronycteris megalotis*, 2 km SW Altamira, Altamira, 609 m, 3-1-68.

T. F. AMAZONAS: 1 female ex *Micronycteris megalotis*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 13-IV-67; 2 males ex 1 *Micronycteris microtis*, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 21-II-66.

Remarks

The Panamanian host of the type series of *Trichobius keenani* was "*Micronycteris megalotis microtis*."

Trichobius lionycteridis Wenzel
(Fig. 21C)

Trichobius lionycteridis Wenzel, 1966:464, Fig. 60C

Venezuelan Survey Records (99 males, 72 females, 1 sex undet.)

APURE: 1 male ex *Carollia perspicillata*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 2-I-68.

BOLIVAR: 1 male and 1 female ex 1 *Sturnira lilium*, 1 male ex 1 *Vampyrops helleri*, 16 males and 15 females ex *Lionycteris spurrelli*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 9-25-VI-66; 1 sex undet. ex *Carollia perspicillata*, 39 males and 26 females ex *Lionycteris spurrelli*, 21 km NE Icabarú, El Pauji, Icabarú, 851 m, 2-8-V-68; 3 males, same host, 11 km NE Icabarú, Icabarú, 750 m, 9-V-68; 2 males and 2 females, same host, 13 km NE Icabarú, Icabarú, 817 m, 8-V-68; 1 male and 1 female, same host, 23 km NE Icabarú, El Pauji, Icabarú, 824 m, 27-IV-68;

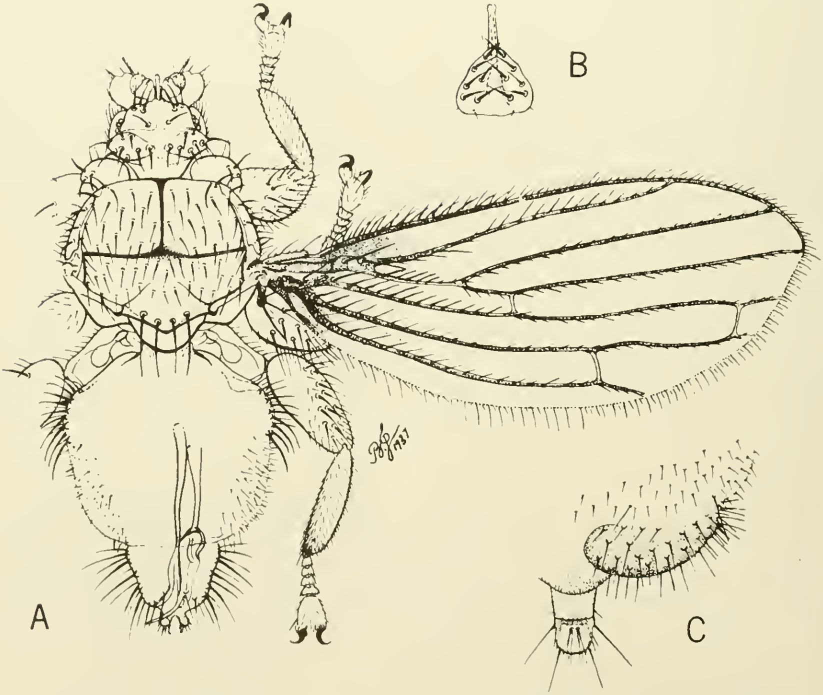

Fig. 20. *Trichobius lonchophyllae* Wenzel, male: dorsal view. From Jobling (1938; as *Trichobius uniformis* Curran).

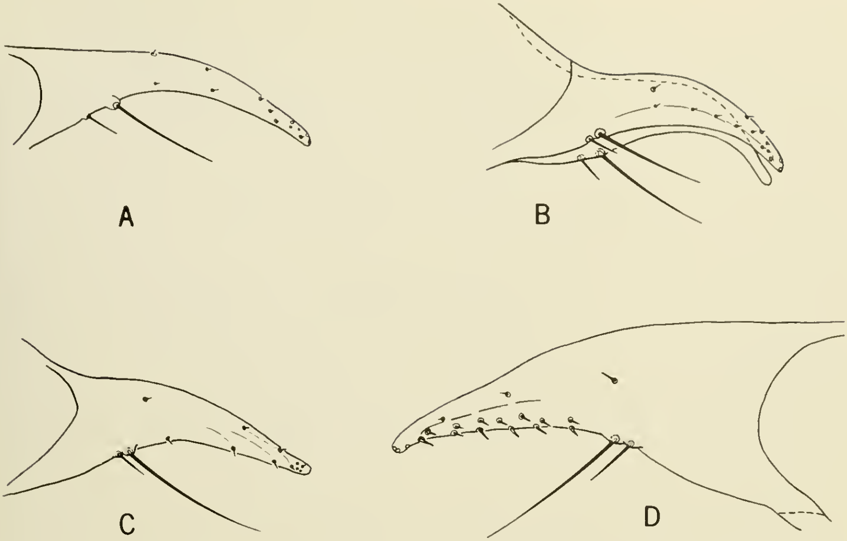

Fig. 21. A-C, male postgonites, *Trichobius uniformis* group: A, *Trichobius keenani* Wenzel; B, *Trichobius uniformis* Curran; C, *Trichobius lionycteridis* Wenzel. D, *Trichobius lonchophyllae* Wenzel.

8 males and 6 females, same host, 85 km SSE El Dorado, Km 125, 871-1,032 m, 10-19-V-66.

T. F. AMAZONAS: 1 male ex 1 *Molossus aztecus*, 13 males and 12 females ex *Lionycteris spurrelli*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 15-28-VII-67; 1 female, same host, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 1-I-67; 1 male and 1 female, same host, Cabecera del Caño Culebra, 40 km NNW Esmeralda, Cerro Duida, 1,400 m, 6-II-67; 1 male, same host, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 12-IX-67; 2 males and 2 females, same host, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 4-X-67; 9 males and 5 females, same host, Río Orinoco, Tamatama, 135 m, 1-15-V-67.

Host Associations

Of 172 specimens of *Trichobius lionycteridis* collected by the survey teams, 166 (96.5 percent) were from 79 *Lionycteris spurrelli* and the remaining 6 were from 5 bats of 4 species.

Trichobius lonchophyllae Wenzel

(Fig. 20, 21D)

Trichobius lonchophyllae Wenzel, 1966:461, Fig. 59A-C, 60D, 61A

Venezuelan Survey Records (49 males, 64 females)

BARINAS: 18 males and 24 females ex *Lonchophylla robusta*, 2 km SW Altamira, Altamira, 609-620 m, 26-XII-67–4-I-68; 4 males and 6 females, same host, 1 male ex 1 *Sturnira lilium*, 7 km NNE Altamira, Altamira, 1,070 m, 25-XII-67; 6 males and 6 females ex *Lonchophylla robusta*, Altamira, 794 m, 20-XII-67–10-I-68.

ZULIA: 11 males and 17 females ex *Lonchophylla robusta*, 21 km SW Machiques, Kasmera, 270 m, 17-23-IV-68; 1 male and 3 females, same host, 19 km WSW Machiques, Novito, 1,135 m, 2-V-68; 8 males and 8 females, same host, 33 km NW La Paz, nr. Cerro Azul, 75 m, 15-VI-68.

Trichobius uniformis Curran

(Fig. 21B)

Trichobius uniformis Curran, 1935:10 (part), Fig. 8.—Wenzel, Tipton, and Kiewlicz, 1966: 459, Fig. 60B, 61B.

Venezuelan Survey Records (119 males, 97 females, 5 sex undet.)

APURE: 1 male ex *Glossophaga longirostris*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 8-XII-65; 1 male and 1 female, same host, 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 14-16-XII-65.

BARINAS: 2 males ex *Glossophaga soricina*, 2 km SW Altamira, Altamira, 609-620 m, 27-XII-

67–1-I-68; 2 males and 1 female, same host, Altamira, 794 m, 20-XII-67.

BOLÍVAR: 1 male ex 1 *Vampyrops helleri*, 12 males and 10 females ex *Glossophaga soricina*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 8-25-VI-66; 2 males and 1 female ex *Glossophaga longirostris*, 7 males, 7 females, and 1 sex undet. ex *Glossophaga soricina*, 20 km W La Paragua, Hato San José, 300-306 m, 1-10-IV-67; 1 sex undet. ex *Glossophaga longirostris*, 47 km ESE Caicara, Hato La Florida, 50 m, 4-V-67; 4 males and 1 female ex *Glossophaga soricina*, 56 km SE El Dorado, Km 67, El Manaco, 150 m, 16-VI-66; 12 males and 10 females, same host, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 8-25-VI-66; 1 male, same host, 45 km NE Icabarú, Santa Lucia de Surukun, Icabarú, 851 m, 29-IV-68; 1 male and 1 female, same host, 85 km SSE El Dorado, Km 125, 1,032 m, 11-17-V-66; 1 male, same host, 50 km SE El Manteco, Río Supamo, 150 m, 8-IV-66.

CARABOBO: 1 male and 1 female ex *Glossophaga soricina*, 2.5 km NW Urama, Urama, 25 m, 14-XI-65; 2 males and 2 females, same host, 6 km ENE Urama, Urama, 25 m, 6-III-66.

FALCÓN: 1 male and 1 female ex 1 *Anoura geoffroyi*, 2 males ex *Glossophaga soricina*, 14 km ENE Mirimire, nr. La Pastora, 122 m, 11-XI-67; 1 male, same host, 16 km ENE Mirimire, nr. La Pastora, 70 m, 1-XII-67; 2 males, same host, 80 km NW Carora, Río Socopito, 470 m, 22-V-68; 3 females ex *Glossophaga longirostris*, 28 km WNW Pto. Cabello, Boca de Yaracuy, 2 m, 23-IX-65; 1 male, same host, 20 km NNE Mirimire, nr. Aguide, 5 m, 13-XI-67.

GUÁRICO: 1 male and 1 female ex *Glossophaga soricina*, 9 km SE Calabozo, Est. Biol. de los Llanos, 100 m, 20-VIII-68; 1 female, same host, 35 km SSW San Juan de los Morros, Hto. Las Palmitas, 181 m, 7-I-68.

MIRANDA: 1 female ex *Glossophaga soricina*, 1 km S Río Chico, 1 m, 24-X-66; 2 males and 2 females, same host, 7 km N Río Chico, nr. Paparo, 1 m, 15-16-XI-66; 7 males and 5 females, same host, Birongo, 60 m, 22-23-I-68; 1 male, same host, 21 km NW Altagracia, Parque Nac. Guatopo, 630 m, 30-IX-66.

MONAGAS: 1 male ex *Glossophaga soricina*, 3 km NW Caripe, nr. San Agustín, 175 m, 12-VII-67.

SUCRE: 1 male and 1 female ex *Glossophaga longirostris*, 8 males and 9 females ex *Glossophaga soricina*, 9 km NE Güiria Ensenada Cauranta, 1-7 m, 3-16-VI-67; 1 male and 1 female, same host, 16 km E Cumaná, ? m, 7-XII-66; 3 males and 4 females, same host, 12 km NE Güiria, Ensenada Cauranta, 90-100 m, 17-19-VI-67.

T. F. AMAZONAS: 2 males ex 1 *Artibeus lituratus*, 19 males, 16 females, and 2 sex undet. ex *Glossophaga soricina*, 1 male ex *Glossophaga longirostris*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 6-27-VII-67; 1 female, same host, 1 male and 3 females ex *Glossophaga soricina*, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 4-8-X-67; 4 males and 2 females, same host, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 1-3-I-67; 1 male, same host, 14 km SSE Pto. Ayacucho, Chaparito, Pto. Ayacucho, 119 m, 2-X-67; 3 males and 3 females, same host, 20 km S Pto. Ayacucho, Las Queseras, Pto. Ayacucho, 135 m, 24-VII–27-IX-67; 1 male, 2 females, and 1 sex undet., same host, 28 km S. Pto. Ayacucho, Guayabal, Pto. Ayacucho, 135 m, 7-12-X-67; 2 males and 3 females, same host, Río Orinoco, Tamatama, 135 m, 28-IV–7-V-67.

TRUJILLO: 1 male ex *Glossophaga soricina*, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 14-IX-65; 1 male, same host, 25 km NNW Valera, Agua Santa, Valera, 90 m, 3-IX-65.

YARACUY: 7 males and 5 females ex *Glossophaga soricina*, 1 male ex 1 *Carollia perspicillata*, 20 km NW San Felipe, Minas de Aroa, 395-400 m, 6-13-XII-67.

ZULIA: 3 males and 5 females ex *Glossophaga soricina*, 21 km SW Machiques, Kasmera, 270 m, 14-19-IV-68; 2 males and 3 females, same host, 19 km WSW Machiques, Novito, 1,135 m, 4-V-68.

Other Venezuelan Material Examined

CARABOBO: 2 males, host unknown, Yuma, 9-IV-49, F. Fernandez Y.; 1 female, *Myotis* sp., same locality data.

Host Associations

Of 221 specimens of *Trichobius uniformis* collected by the survey teams, 200 (90.5 percent) were from 128 *Glossophaga soricina*, 15 (6.8 percent) ex 11 *G. longirostris*, and the remaining 6 ex 4 bats of 4 species.

Trichobius dugesii group

Many of the species of this group are extraordinarily similar in most characters, and identification can be very difficult or impossible without authoritatively identified comparative material.

Although the male postgonites are usually distinctive, they are difficult to use for routine identification because they may be twisted and curved laterally (see above under Genus *Trichobius*).

Trichobius dugesii complex

Trichobius dugesii Townsend

(Fig. 22A, 25G, H)

Trichobius dugesii Townsend, 1891:106.—Wenzel, Tipton, and Kiewlicz, 1966:478, Fig. 68G-H, 69A.

Trichobius blandus Curran, 1935:10, Fig. 11.

VENEZUELAN SURVEY RECORDS (210 males, 141 females, 3 sex undet.)

APURE: 1 male and 2 females ex *Glossophaga soricina*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 30-I-68; 42 males and 36 females ex *Glossophaga longirostris*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 6-28-XII-65; 2 males, same host, 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 14-16-XII-65; 2 males and 1 female, same host, 1 km W Pto. Páez, Cerro de Murcielagos, Pto. Páez, 76 m, 24-I-66.

BARINAS: 9 males, 8 females, and 1 sex undet. ex *Glossophaga soricina*, 2 km SW Altamira, Altamira, 609-620 m, 26-XII-67–5-I-68; 1 male and 1 female, same host, Altamira, 794 m, 20-XII-67.

BOLÍVAR: 1 male and 1 female ex 2 *Micronycteris nicefori*, 25 km SE El Manteco, Los Patos, 150 m, 5-IV-66; 1 male and 1 female ex *Glossophaga soricina*, 56 km SE El Dorado, Km 67, El Manaco, 150 m, 16-VI-66; 11 males and 4 females, same host, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 13-25-VI-66; 8 males and 4 females, same host, 20 km W La Paragua, Hato San José, 300-306 m, 1-10-IV-67.

CARABOBO: 16 males and 16 females ex *Glossophaga soricina*, 2.5 km NW Urama, Urama, 25 m, 14-XI-65; 2 males and 1 female, same host, 5 km ENE Urama, Urama, 25 m, 6-III-66; 2 males and 1 female, same host, 6 km ENE Urama, Urama, 25 m, 6-III-66.

DTO. FEDERAL: 1 female ex *Glossophaga soricina*, nr. El Limón, 48 km W Caracas, Hda. Carapiche, 398 m, 20-VIII-66.

FALCÓN: 10 males and 6 females ex *Glossophaga longirostris*, 1 male ex *Glossophaga soricina*, 20 km NNE Mirimire, nr. Aguide, 1-5 m, 13-XI-67; 1 male and 1 female, same host, 1 male and 3 females ex *Glossophaga longirostris*, Capatárida, 55 m, 23-25-VI-68; 1 male, same host, 28 km WNW Pto. Cabello, Boca de Yaracuy, 2 m, 23-IX-65; 1 male and 2 females ex *Glossophaga soricina*, 14 km ENE Mirimire, nr. La Pastora, 122 m, 11-XI-67; 1 male and 1 female, same host, 16 km ENE Mirimire, nr. La Pastora, 70 m, 28-29-XI-67; 1 female, same host, 13 km ESE Mirimire, nr. San Pablo, 270 m, 17-XI-67; 1 male, same host, 80 km NW Carora, Río Socopito, 470 m, 22-V-68.

GUAJIRA: 7 males and 3 females ex *Glossophaga longirostris*, 37 km NNE Paraguaipoa, nr. Cojoro, 15 m, 26-VI–1-VII-68.

GUÁRICO: 2 males ex *Glossophaga longirostris*, 1 male ex *Glossophaga soricina*, 35 km SSW San Juan de los Morros, Hto. Las Palmitas, 181 m, 7-I-68; 2 males, same host, 14 km SE Calabozo, nr. Río Orituco, Est. Biol. de los Llanos, 100 m, 21-VIII-68; 1 male, same host, 9 km SE Calabozo, Est. Biol. de los Llanos, 100 m, 20-VIII-68.

LARA: 7 males and 3 females ex *Glossophaga longirostris*, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 521-537 m, 14-17-VII-68; 1 female and 1 sex undet., same host, 10 km NE El Tocuyo, San José, El Tocuyo, 580 m, 23-VII-68; 1 male, same host, 47 km NE El Tocuyo, La Concordia, El Tocuyo, 592 m, 24-VII-68.

MIRANDA: 1 male ex *Carollia brevicauda*, 5 km NNW Guarenas, Curupao, 1,180 m, 13-X-66; 1 male and 1 female ex *Glossophaga longirostris*, 2 females ex *Glossophaga soricina*, 1 km S Río Chico, 1 m, 23-26-X-66; 5 males, same host, Birongo, 60 m, 21-23-I-68; 2 males and 1 female, same host, 21 km NW Altagracia, Parque Nac. Guatopo, 630 m, 23-24-IX-66.

MONAGAS: 1 female ex *Carollia brevicauda*, 3 km NW Caripe, nr. San Agustín, 1,275 m, 11-VII-67; 3 males and 2 females ex *Glossophaga soricina*, 55 km SSE Maturín, Hato Mata de Bejuco, 18 m, 3-VI-68.

NUEVA ESPARTA: 1 female ex *Glossophaga longirostris*, 1 km E La Guardia, Isla Margarita, 18 m, 18-I-67; 1 male, same host, 3 km NE La Asunción, Isla Margarita, 305 m, 20-I-67; 2 males, same host, 3 km NNE La Asunción, Isla Margarita, 38 m, 12-I-67; 2 males and 1 female, same host, 3 km S La Asunción, Isla Margarita, 53-65 m, 21-I–2-II-67.

SUCRE: 3 males and 1 female ex *Glossophaga longirostris*, 3 males ex *Glossophaga soricina*, 16 km E Cumaná, ? m, 7-22-XII-66; 1 male ex 1 *Molossus ater*, 14 km E Cumaná, 1 m, 8-XII-66; 1 male ex *Glossophaga soricina*, 21 km E Cumaná, ? m, 9-XII-66; 1 male, same host, 12 km NE Güiria,, Ensenada Cauranta, 100 m, 17-VI-67; 7 males, 4 females, and 1 sex undet., same host, 9 km NE Güiria, Ensenada Cauranta, 1-7 m, 3-16-VI-67.

T. F. AMAZONAS: 1 male and 2 females ex *Glossophaga longirostris*, 1 male and 1 female ex *Glossophaga soricina*, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m,

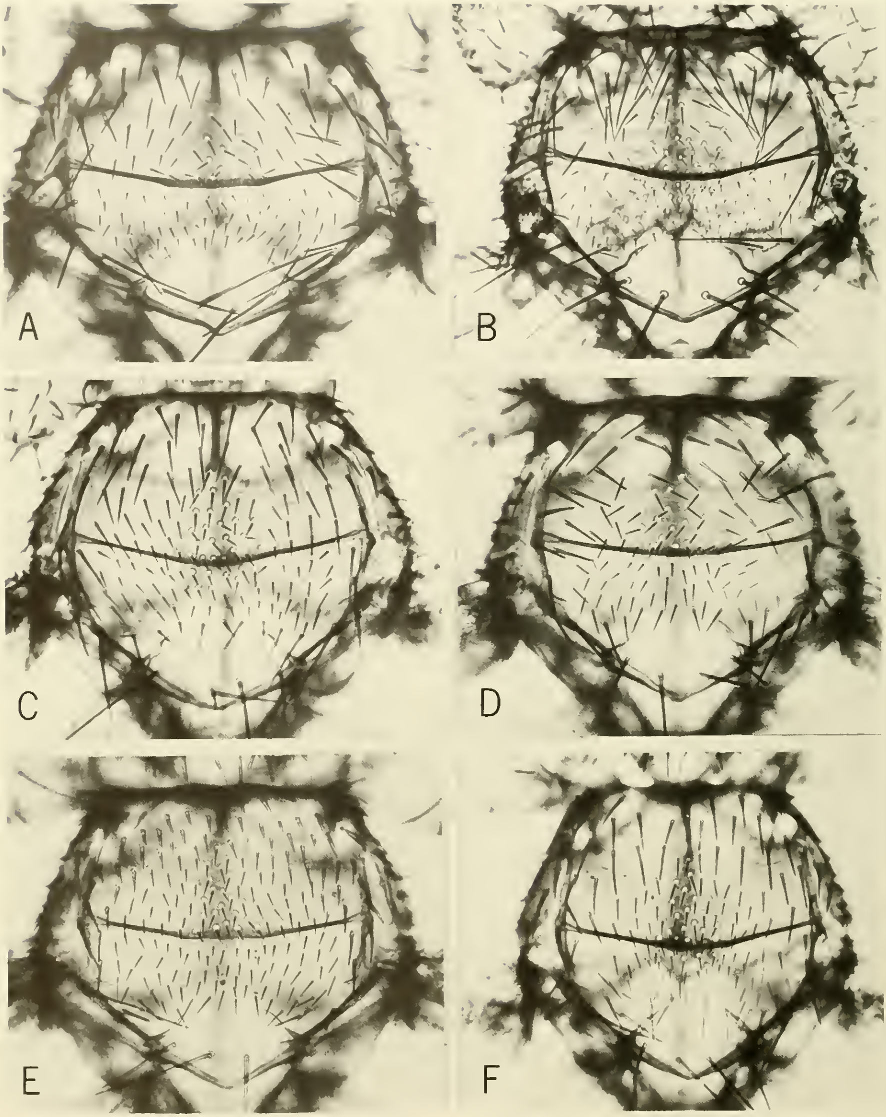

Fig. 22. Thorax, dorsal view, of species of *Trichobius dupesii* group: A, *Trichobius dugesii* Townsend, male; B, *Trichobius propinquus*, new species (allotype); C, *Trichobius persimilis*, new species (SVP 31957); D, *Trichobius joblingi* Wenzel; E, *Trichobius macrophylli* Wenzel, female; F, *Trichobius urodermae* Wenzel, female. A, D, E, F from Wenzel et al. (1966).

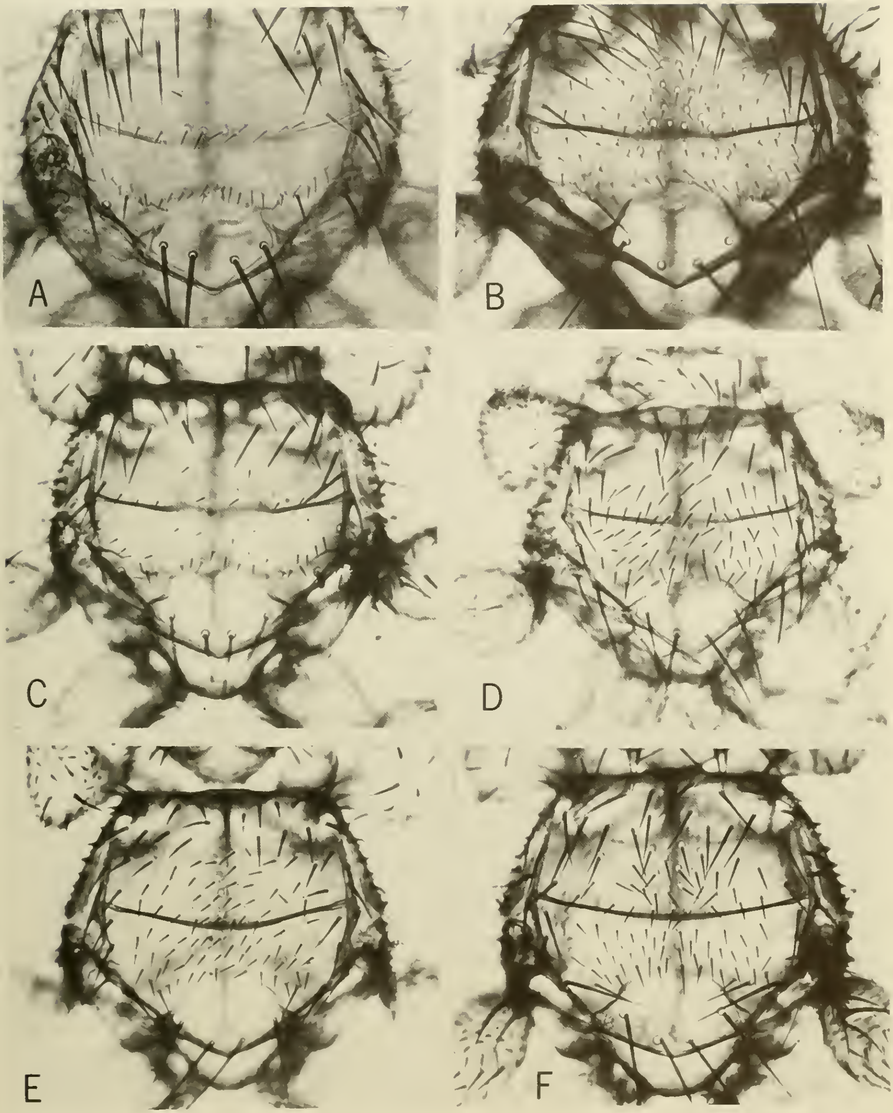

Fig. 23. Thorax, dorsal view, of species of *Trichobius dugesii* group: A, *Trichobius parasiticus* Gervais, male; B, *Trichobius diphyllae* Wenzel, male; C, *Trichobius diaemi*, new species, male (SVP 27821); D, *Trichobius ethophallus*, new species (male holotype); E, *Trichobius tuttlei*, new species, female (SVP 18706); F, *Trichobius flagellatus*, new species, female (SVP 2563). A-B from Wenzel et al. (1966).

4-X-67; 3 males ex 3 *Vampyrops helleri*, 12 males and 9 females ex *Glossophaga soricina*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 10-VII–27-IX-67; 2 females, same host, Río Orinoco, Tamatama, 135 m, 27-IV–7-V-67; 1 male, same host, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 3-I-67; 1 male and 1 female, same host, 20 km S Pto. Ayacucho, Las Queseras, Pto. Ayacucho, 135 m, 24-VII–27-IX-67; 1 female, same host, 28 km S Pto. Ayacucho, Guayabal, Pto. Ayacucho, 135 m, 7-X-67; 1 female, same host, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 7-IX-67.

TRUJILLO: 1 female ex *Glossophaga soricina*, 2 males ex *Glossophaga longirostris*, 25 km NNW Valera, Agua Santa, Valera, 90-164 m, 3-IX-65; 1 male, same host, 1 male and 1 female ex *Glossophaga soricina*, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 19-23-VIII-65; 3 males and 1 female ex *Glossophaga longirostris*, 26 km N Valera, Quebrada Seca, Valera, 131 m, 21-X-65.

YARACUY: 3 males and 4 females ex *Glossophaga soricina*, 20 km NW San Felipe, Minas de Aroa, 395-400 m, 12-21-XII-67.

YARACUY/CARABOBO: 1 male ex *Glossophaga soricina*, 10 km NW Urama, Urama, 25 m, 6-III-66.

ZULIA: 2 males ex *Glossophaga longirostris*, 34 km NNE Paraguaipoa, nr. Cojoro, 15 m, 24-26-VI-68; 1 male, same host, 35 km NNE Paraguaipoa, nr. Cojoro, 15 m, 1-VII-68; 1 male and 1 female, same host, 36 km NNE Paraguaipoa, nr. Cojoro, 15 m, 25-29-VI-68; 2 males ex *Glossophaga soricina*, 39 km WNW Encontrados, El Rosario, 37 m, 31-III-68; 2 males and 2 females, same host, 21 km SW Machiques, Kasmera, 270 m, 17-20-IV-68; 2 males and 2 females, same host, 19 km WSW Machiques, Novito, 1,135 m, 4-V-68.

Other Venezuelan Material Examined

CARABOBO: 28 males and 6 females (host unknown), Yuma, 9-IV-49, F. Fernando Y.; 1 male and 1 female, same data, but ex *Myotis* sp. [1], 2-VII-55.

Host Associations

Of 354 specimens of *Trichobius dugesii* collected by the survey teams, 346 (97.7 percent) were from species of *Glossophaga* as follows: 157 (44.3 percent) ex 99 *G. longirostris* and 187 (53 percent) ex 126 *G. soricina*. The remaining records probably represent temporary associations in common roosting sites of the hosts, contaminants, or errors of association.

Remarks

Central American specimens of *T. dugesii* are usually very easy to separate from *T. joblingi* and related species, because of the normally very short scutal setae of the antescutellar row. In many Venezuelan specimens these setae are longer or are a mixture of longer and very short setae, and the short discal mesonotal setae appear to be more numerous. This makes identification of liquid-preserved specimens very difficult.

Trichobius propinquus, new species

(Fig. 22B, 26G)

Though noticeably larger, *Trichobius propinquus*, n. sp. is otherwise virtually identical to *Trichobius dugesii* in most characters of both male and female. However, it does differ markedly in that the prescutum has more numerous (and longer) long setae, most of them macrosetae; these long setae are especially noticeable in the females, which have 54-58, as opposed to 42-44 in *dugesii*, and in the males there are 42-46, as opposed to 34-36 in *dugesii*. Most of these long setae are nearly as long as or longer than the median suture in female *propinquus;* in the males, this is true only of the setae in the anterior angles and of some along the sides, the more median ones being noticeably shorter in the males. Thus, in mesonotal chaetotaxy the males of *propinquus* somewhat resemble females of *dugesii*. In *dugesii* females only a few of the longest prescutal setae are as long as the median suture. As in *propinquus*, the longer prescutal setae of *dugesii* males become shorter medially than those on sides and in anterior angles, and, with the exception of one or two in the extreme anterolateral angles, none are as long as the median suture.

Description

Head. Eyes rather small, with 10 facets, their length shorter than width of each laterovertex. Laterovertices with 5 long, strong and 1 short setae. Occipital lobes with 8 strong and 2 short setae along posterior margin, several of the setae longer than occipital plates are wide. Palpi subovate, their inner anterior margin oblique; strongly setose on the underside, on more than apical half. Theca longer than broad.

Thorax. Thorax broad, anterior margin slightly projecting at middle and feebly emarginate at midline; median longitudinal suture present on about anterior half or slightly less; transverse suture distinctly angulate. Prescutum: female with ± 54-58 very long setae (mostly macrosetae) anteriorly and on sides, a few of those near the short discals slightly shorter, most of them longer than the median suture; male with 42-46 long setae, these largely restricted

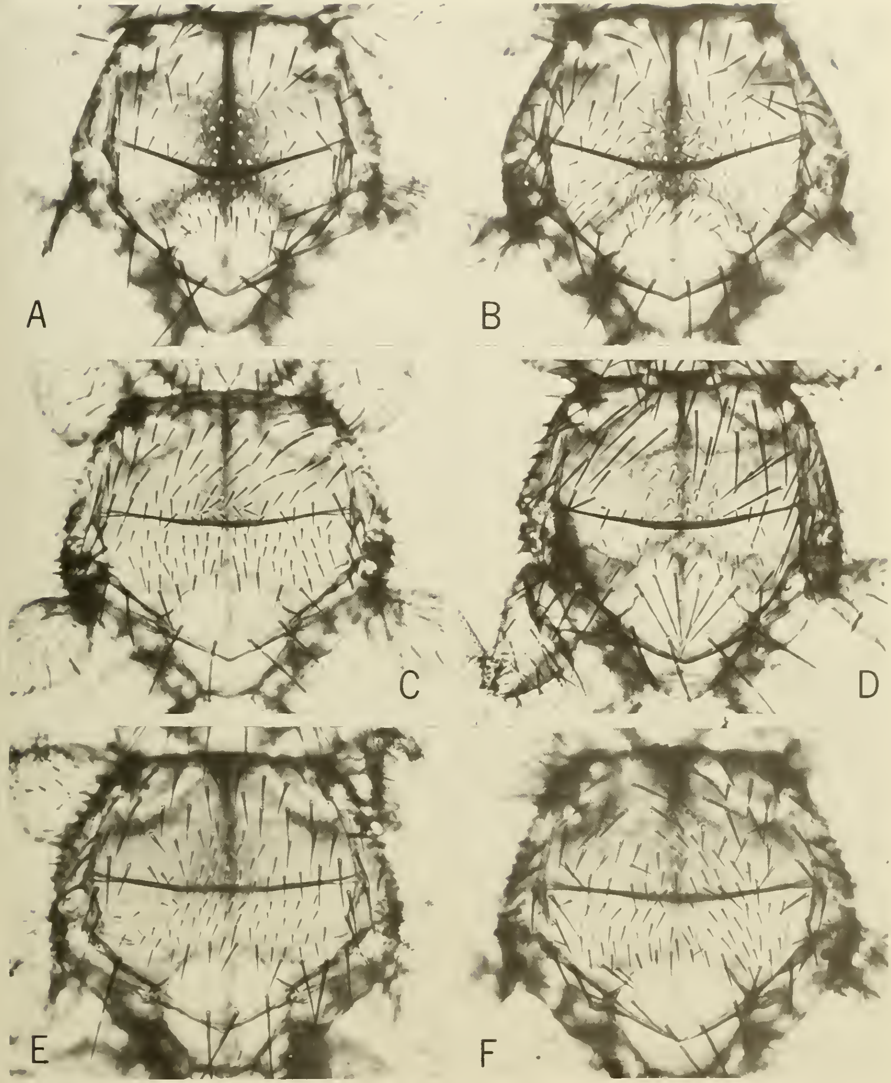

Fig. 24. Thorax, dorsal view, of species of *Trichobius dugesii* group: A, *Trichobius angulatus*, new species, male (SVP 8571); B, *Trichobius assimilis*, new species (female allotype); C, *Trichobius handleyi*, new species, female (SVP 23216); D, *Trichobius tiptoni*, new species, female (SVP 33163); E, male, and F, female, *Trichobius dugesioides* Wenzel.

to anterior angles and sides, those on each side of median suture and next to the short discal seta, distinctly shorter, not as long as suture; median discal area with 22-25 very short, very fine setae. Scutum with ± 60 very short, fine setae which, like those of the prescutum, can hardly be seen in alcohol-preserved specimens; antescutellar row consisting of 8-10 setae, mostly about twice as long as the short discals, but still very short, and with a long macrosetae on each end or row; 4 macrosetae along each lateral margin. Four scutellar setae very long, about as long as or longer than scutellum is wide. Mesosternum not strongly produced, sides strongly oblique; anterior margin truncate or very feebly indented. Metasternal lobe broad but very short, scarcely distinguishable, translucent.

Legs. Generally clothed with very fine, short setae; profemora with numerous long setae along upper surface, those along midlength conspicuously longer; midfemora with long setae on upper surface on apical half; hindfemora with long setae on upper surface beginning at about basal fourth; tibiae with very fine, short setae, those of the hind tibiae somewhat longer.

Abdomen. Lateral lobes of tergum 1+2 each with ± 25 setae, about half of them very strong, of varying lengths, most others short, especially along posterolateral margin. Sternum 2 rather evenly setose without conspicuously longer setae laterally. Female. Lateral abdominal connexivum with minute setae, these becoming somewhat longer ventrally, without a conspicuous cluster of strong setae behind tergum 1+2, but with a few that are slightly longer and heavier. Tergum 7 with 2 pairs of short setae in tandem; the anterior pair slightly longer and more widely separated. Supra-anal plate with 4 slender macrosetae and, on each lateral margin, a seta that is about ⅓ as long. Seventh sternites oval, rather oblique, with 15-17 setae of varying lengths, the anterior 5-6 mostly rather short, others of intermediate length, 3-4 rather long macrosetae. Male. Sternum 6 present; sternum 7+8 with 5 setae on each side, 2 of these conspicuously longer than the others; each side of tergum 9 with about 10 setae, mostly macrosetae, the apical ones shorter than the anterior ones. Postgonites asymmetrical, twisted to the left, appearing almost straight below in lateral profile (Fig. 26G).

Measurements

	Males	Females
BL	1.46-1.65	1.53-1.83
TL	0.54-0.57	0.53-0.68
WL	1.39-1.70	1.36-1.73
WW	0.68-0.75	0.66-0.80

Type Data: Male holotype ex *Anoura geoffroyi* (SVP 20038), Venezuela, Falcón, 14 km ENE Mirimire, nr. La Pastora, 60 m, 23-XI-67 and female allotype, same host (SVP 14985), same locality data but 21-XI-67.

Paratypes—VENEZUELA. Bolívar: 1 male ex *Anoura geoffroyi*, 85 km SSE El Dorado, Km 125, 1,032 m, 19-V-66.

Carabobo: 1 female ex *Anoura geoffroyi*, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 28-XI-67.

Falcón: 6 males and 3 females, same host and locality data as holotype except for 60-122 m, 11-23-XI-67; 5 males, 3 females, and 1 sex undet. ex *Anoura geoffroyi*, 16 km ENE Mirimire, nr. La Pastora, 70 m, 28-XI—1-XII-67.

Sucre: 1 male ex *Anoura* sp. A, 26 km ESE Carúpano, Manacal, 366 m, 19-VII-67.

Zulia: 2 males ex *Anoura* sp. A, 19 km WSW Machiques, Novito, 1,135 m, 2-V-68.

Other Material Examined

TRINIDAD: 1 male (FMNH) ex *Anoura geoffroyi*, Mt. Tamana, Tamana Cave, 11-XI-54, C. C. Sanborn (Field Museum Trinidad Zoological Field Trip) and 1 male (FMNH), same locality but 20-X-57, T. H. G. Aitken (Trinidad Virus Laboratory).

Host Associations

Of 25 specimens of *Trichobius propinquus* collected by the survey teams, 22 (88 percent) were from 14 *Anoura geoffroyi* and 3 (12 percent) ex 2 *Anoura* sp. A.

Trichobius joblingi Wenzel

(Fig. 4B, 22D, 25E)

Trichobius joblingi Wenzel, 1966:481, Fig. 68E, 70

Trichobius blandus, authors (part), not Curran

Trichobius dugesii, authors (part), not Townsend

Venezuelan Survey Records (1,383 males, 1,062 females, 22 sex undet.)

This species occurs throughout Central and South America, with its characteristic host—the ubiquitous *Carollia perspicillata*. It was taken so commonly at so many collecting sites, that enumeration of the many separate collections would serve no purpose. To briefly summarize, the survey teams collected this fly at 97 localities

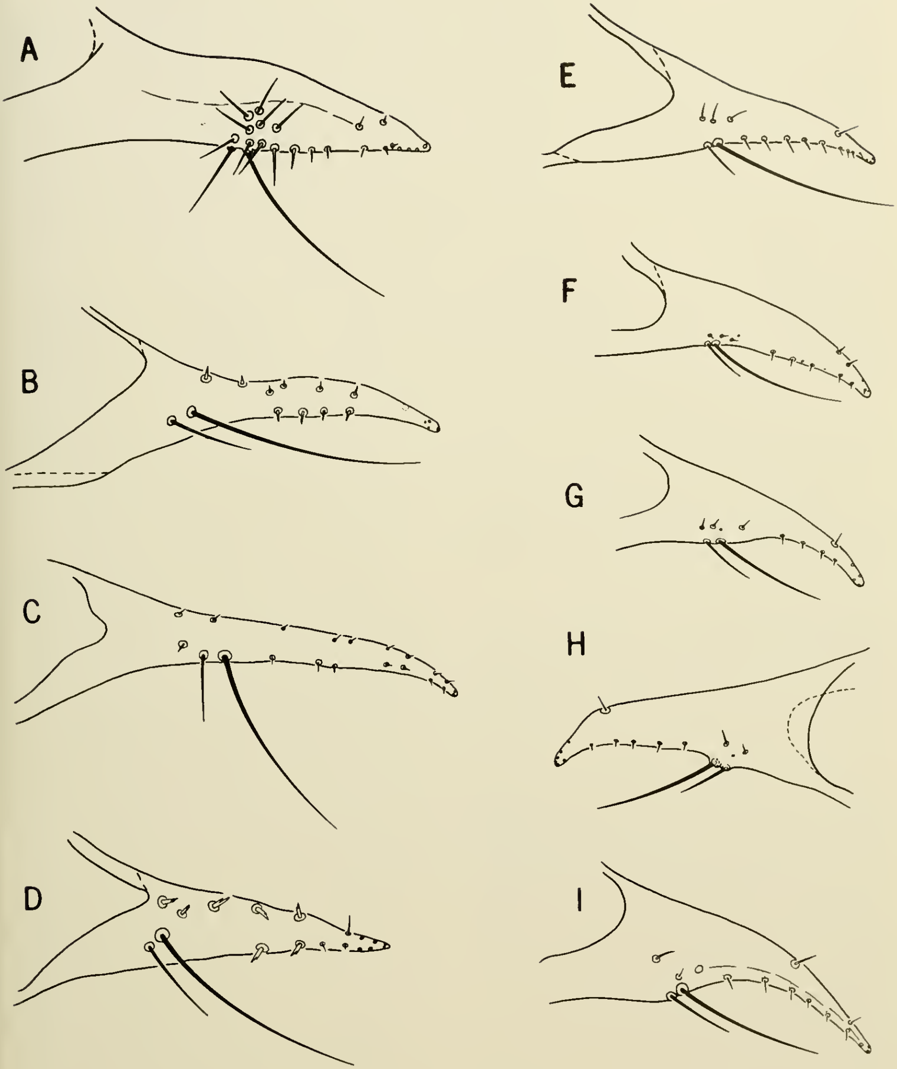

Fig. 25. Male postgonites of species of *Trichobius dugesii* group: A, *Trichobius parasiticus* Gervais; B, *Trichobius diphyllae* Wenzel; C, *Trichobius furmani* Wenzel; D, *Trichobius dugesioides* Wenzel; E, *Trichobius joblingi* Wenzel; F, *Trichobius macrophylli* Wenzel; G-H. *Trichobius dugesii* Townsend; I. *Trichobius urodermae* Wenzel. From Wenzel et al. (1966).

in 14 states, as follows: Apure (4 localities, 24-76 m); Barinas (3 localities, 611-1.070 m); Bolívar (15 localities, 50-1,042 m); Carabobo (3 localities, 25-1,537 m); Dto. Federal (2 localities, 380-1,524 m); Falcón (9 localities, 2-1,260 m); Guárico (4 localities, 100-630 m); Miranda (7 localities, 1-1,160 m); Monagas (3 localities, 854-1,320 m); Sucre (5 localities, 2-380 m); T. F. Amazonas (15 localities, 114-195 m); Trujillo (7 localities, 23-164 m); Yaracuy (2 localities, 25-100 m); Zulia (13 localities, 24-270 m). Many specimens of *Carollia perspicillata* were not examined for parasites, or even more localities would be reported.

Other Venezuelan Material Examined

ARAGUA: 1 female ex "*Enchisthenes harti*" (= *A. hartii*) [1], Rancho Grande Biol. Station, 29-VIII-62, J. V. Scorza, C. and A. J. Machado; 3 sex undet. ex *Carollia perspicillata*, same locality data except for 30-III-60, C. O. Handley, Jr.

BOLÍVAR: 6 males and 1 female ex 1 *Carollia p. perspicillata*, 38 km S El Dorado, 30-VIII-62, J. Ojasti.

CARABOBO: 4 males and 3 females, host unknown, Borburata, 3-VI-47, F. Fernandez Y.

MONAGAS: 9 males and 6 females ex *Carollia p. perspicillata*, Guacharo Cave, 900 m, 16-VIII-62, J. Ojasti.

Host Associations

Of 2,467 specimens of *Trichobius joblingi* collected by the survey teams, 2,113 (85 percent) were from 889 *Carollia perspicillata*, 242 (9.8 percent) ex 60 *Phyllostomus elongatus*, 36 (1.46 percent) ex 21 *Carollia brevicauda* (taken between 135-1,524 m), 15 (0.6 percent) ex 10 *Sturnira lilium*, 11 (0.4 percent) ex 11 Carollia sp., 3 (.01 percent) ex 2 *Carollia castanea*, and the remaining 47 (1.9 percent) ex 34 bats of the following 16 species: *Anoura geoffroyi*, *Artibeus fuliginosus*, *Artibeus jamaicensis*, *Artibeus lituratus*, *Desmodus rotundus*, *Glossophaga soricina*, *Macrophyllum macrophyllum*, *Micronycteris minuta*, *Micronycteris nicefori*, *Noctilio leporinus*, *Phyllostomus hastatus*, *Pteronotus parnellii*, *Rhinophylla pumilio*, *Sturnira erythromos*, *Sturnira tildae*, and *Trachops cirrhosus*.

It is clear that, as in Panama, the characteristic host of *T. joblingi* is the abundant *C. perspicillata*. Except for the records from *P. elongatus*, most others probably represent transitory transfers through roosting sites or are contaminants resulting from collecting associations. *Phyllostomus elongatus*, as will be noted elsewhere, appears to be a "facultative" host for a number of species which normally parasitize other hosts.

Trichobius persimilis, new species

(Fig. 22C)

Description

Almost identical to *Trichobius joblingi* and the description (Wenzel, 1966:481) of that species applies equally well except as follows: *Thorax*. Transverse mesonotal suture generally slightly more angulate than in *joblingi*. *Abdomen*. Female. Without a cluster of 3-5 setae on each side behind lateral lobes of tergum 1 + 2 that are distinctly heavier and longer than other connexival setae (present in *joblingi*). Male. Sternum 6 absent (present in *joblingi*). Postgonites as in *joblingi*.

Measurements

	Males	Females
BL	1.26-1.64	1.44-1.79
TL	0.51-0.57	0.58-0.66
WL	1.35-1.42	1.36-1.77
WW	0.62-0.72	0.61-0.79

Type Data: Male holotype ex *Carollia brevicauda* (SVP 32817) and female allotype, same host (SVP 32815), Venezuela, Carabobo, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 28-29-XII-67.

Paratypes—VENEZUELA. Apure: 1 male ex *Carollia brevicauda*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 22-I-68. Barinas: 1 female ex *Carollia perspicillata*, 16 males and 6 females ex *Carollia brevicauda*, Altamira, 794 m, 14-XII-67—10-I-68; 2 males and 1 sex undet., same host, 1 km SW Altamira, Altamira, 794 m, 14-XII-67; 13 males and 13 females, same host, 2 km SW Altamira, Altamira, 609-620 m, 27-XII-67—3-I-68; 4 males and 5 females, same host, 5 km SW Altamira, Altamira, 794 m, 13-XII-67; 1 male, same host, 7 km NNE Altamira, Altamira, 1,070 m, 25-XII-67. Bolívar: 1 male and 3 females ex *Carollia perspicillata*, 20 km W La Paragua, Hato San José, 306 m, 6-III-67; 1 female, same host, 45 km NE Icabarú, Santa Lucia de Surukun, Icabarú, 851 m, 30-IV-68; 3 females ex 2 *Phyllostomus elongatus*, 25 km SE El Manteco, Los Patos, 350 m, 5-IV-66. Carabobo: 2 males ex *Carollia perspicillata*, 31 males, 14 females, and 1 sex undet. ex *Carollia brevicauda*, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 26-30-XI-67; 1 male, same host, 3 km SW Montalbán, Hda. La Canada, Montalbán, 618 m, 22-XI-67; 3 males and 2 females, same host, 3 km W Montalbán, La Leonera, Montalbán, 900 m, 22-23-XI-67; 3 males, same host, 9 km NE Montalbán, Cumbre Canoabo, Montalbán, 752-1,245 m, 1-XI-67. DTO. FEDERAL: 1 female ex 1 *Vampyrops umbratus*, 12 males and 5 females ex *Carollia brevicauda*, 4 km NNW Caracas, Los Venados, 1,400-1,559 m, 21-VII–13-VIII-65; 9 males and 6 females, same host, 1 female ex 1 *Chiroderma salvini*, 5 km NW Caracas, nr. Clavelitos, Boca Tigre Valley, 1,394 m, 27-VIII-65; 1 female, same host, nr. El Limón, 48 km W Caracas, Hda. Carapiche, 380 m, 21-VIII-66. FALCÓN: 1 male ex *Carollia brevicauda*, 84 km NW Carora, Cerro Socopo, 1,260 m, 17-V-68. MIRANDA: 1 male ex 1 *Sturnira ludovici*, 24 males and 7 females ex *Carollia brevicauda*, 5 km NNW Guarenas, Curupao, 1,160 m, 5-X–23-XII-66; 1 male and 2 females, same host, 13 km SE Caracas, nr. El Encantado, El Encantado, 570 m, 14-I-68. MONAGAS: 2 males and 4 females ex *Carollia brevicauda*, 3 km NW Caripe, nr. San Agustín, 1,275 m, 11-VII-67; 1 male and 1 female, same host, 5 km NW Caripe, San Agustín, 1,160 m, 26-VI-67. ZULIA: 1 female ex 1 *Carollia castanea*, 21 km SW Machiques, Kasmera, 270 m, 22-IV-68; 1 female ex 1 *Phyllostomus discolor*, 39 km WNW Encontrados, El Rosario, 37 m, 31-III-68.

HOST ASSOCIATIONS

Of 211 specimens of *Trichobius persimilis* that were collected by the survey teams, 191 (90.5 percent) were from 126 *Carollia brevicauda*, 8 (3.8 percent) ex 4 *Carollia perspicillata* (at elevations above 306 meters), 6 (2.84 percent) ex 2 *Phyllostomus elongatus*, and the remaining 6 specimens from 5 bats of 5 different species.

REMARKS

Were it not for the nearly invariable association of these flies with *Carollia brevicauda*, one would be tempted to regard them as variants of *T. joblingi*. The presence or absence of the sixth sternum may be difficult to determine in identifying this species and *T. joblingi*. It is very small and often very inconspicuous in *T. joblingi*.

Interestingly, the host association and altitudinal distribution of this fly is paralleled by that of *Speiseria peytoni*, n. sp. (q.v.) which occurs on C. brevicauda, while *S. ambigua* occurs on *C. perspicillata*.

Trichobius persimilis was so rarely taken from *C. perspicillata*, and *T. joblingi* so rarely from *C. brevicauda*, that one may question the records; but I believe that at least some, if not most, are valid.

Trichobius macrophylli Wenzel

(Fig. 22E, 25F)

Trichobius macrophylli Wenzel, 1966:486, Fig. 68F, 69B

VENEZUELAN SURVEY RECORDS (58 males, 36 females)

APURE: 4 males and 6 females ex *Macrophyllum macrophyllum*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 6-XII-65.

BOLÍVAR: 2 males ex *Macrophyllum macrophyllum*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 10-VI-66; 1 male, same host, 50 km SE El Manteco, Río Supamo, 150 m, 11-IV-66.

GUÁRICO: 12 males and 8 females ex *Macrophyllum macrophyllum*, 35 km SSW San Juan de los Morros, Hto. Las Palmitas, 181 m, 7-I-68.

T. F. AMAZONAS: 2 males and 3 females ex *Macrophyllum macrophyllum*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 10-II-67; 13 males and 8 females, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 5-10-IV-67.

ZULIA: 22 males and 11 females ex *Macrophyllum macrophyllum*, 56 km WNW Encontrados, El Rosario, 76 m, 10-28-III-68; 2 males, same host, 61 km WNW Encontrados, El Rosario, 52 m, 28-III-68.

OTHER VENEZUELAN MATERIAL EXAMINED

Twenty-one males and 16 females, "Sobre Chiroptera," Lago de Valencia, 25-VIII-48, J. Racenis.

Trichobius handleyi, new species

(Fig. 24C, 26E)

Distinct from other species of the *dugesii* complex in the following combination of characters: the small eyes, densely setose palpi, the extensive area of prescutal microtrichia (visible only in slide preparations), the densely setose mesonotum with long antescutellar setae, the very short metasternal lobe, and the symmetrical (not twisted) male postgonites.

Also, the occipital lobes in most specimens have 8-10 rather than the usual 7 strong setae. It differs from *T. macrophylli*, which also have a very short metasternal lobe, similar palpi, and mesonotal chaetotaxy, in having small eyes (conspicuous, with large facets, in *macrophylli*); a trapezoidal tergum 7 with 2 pairs of setae in tandem (very small, transverse, with setae in a transverse row in *macrophylli*); sternum 6 present in the male (absent in *macrophylli*); and symmetrical (nontwisted) male postgonites.

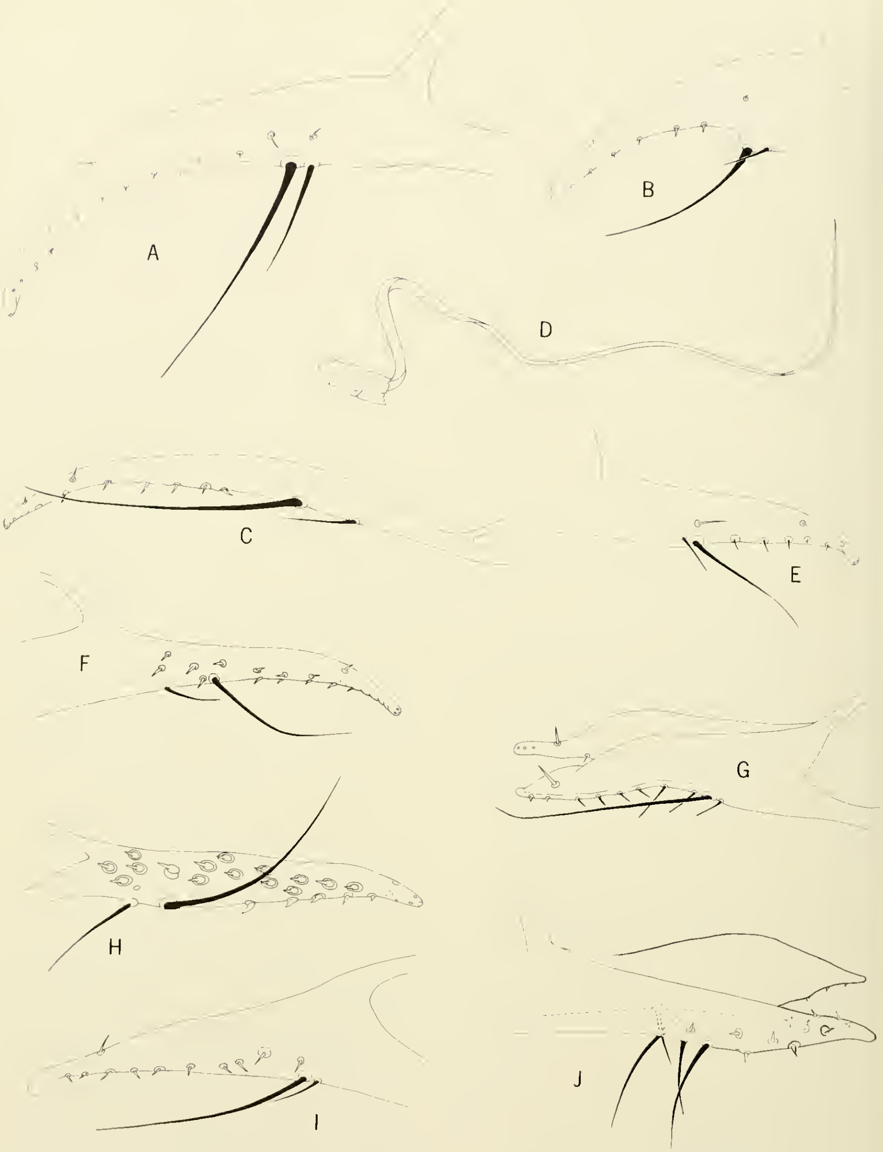

Fig. 26. Male postgonites (except D) of species of *Trichobius dugesii* group: A, *Trichobius assimilis,* new species (SVP 22086); B, *Trichobius angulatus,* new species (holotype); C, right postgonite and D, aedeagus; *Trichobius flagellatus,* new species (SVP 16442); E, *Trichobius handleyi,* new species (SVP 23216); F, *Trichobius ethophallus,* new species (SVP 5503); G, *Trichobius propinquus,* new species (SVP 20274); H, *Trichobius tuttlei,* new species (holotype); I, *Trichobius tiptoni,* new species (SVP 33073); J, *Trichobius diaemi,* new species (SVP 26861). All drawn to same scale.

The only other species of the *dugesii* group with such an extensive area of microtrichia is *T. furmani*, a member of the *parasiticus* complex.

Description

Eyes very small with 10 facets, their length a little more than half width of each laterovertex and less than greatest length of each occipital lobe. Each laterovertex with 5 strong and 1 short setae; occipital lobes each with 8-10 strong setae and 2 short ones along posterior margin. Palpi subovate, apices rounded, apical macroseta without a large gap between it and the next most mesal seta, the interval between them approximately equal to that between other distal setae.

Thorax. Thorax broad, somewhat depressed; anterior margin slightly produced at middle, with a slight emargination at midline; median suture present on a little less than apical half of prescutum, transverse suture very feebly bowed or angulate. Prescutum with ± 50 longer setae and 50-55 shorter ones, but these, though denser at middle, become gradually longer anteriorly and laterally, the longest setae along anterior margin and sides. Scutum with approximately 60 short discal setae similar to those of prescutum, these slightly longer laterally, and a row of about 8 long antescutellar setae which extend posteriorly about half length of scutellum, mostly twice as long as discal setae or a little longer; lateral margins of prescutum each with 4 macrosetae. Microtrichia of prescutum covering a broadly triangular area which begins near basolateral angle, widens out anteriorly along anterior margin to include the anterior angles, and extends medially slightly beyond the second setae from the median suture; microtrichia of scutum along margin of notopleural suture extending inwardly to enclose marginal macrosetae, and along posterior margin to beyond second seta from margin. Mesosternum not strongly produced, lateral margins strongly oblique, anterior margin feebly emarginate. Metasternal lobe very short, translucent, very difficult to see in slide preparations.

Wings. Without distinctive characters, third crossvein slightly nearer first than second. *Legs.* Outer surface of profemora clothed with short setae which become slightly longer distally; upper surface with about 10 macrosetae and 7 or 8 other strong setae on about apical ⅔; midfemora with similar setation but with fewer long setae; hindfemora with about 8 macrosetae along upper edge, beginning at about basal fourth, and a dozen or more other longer setae on lateral surface, these becoming conspicuously longer distally.

Abdomen. Lateral lobes of tergum 1+2 with ± 27 setae, about 12 of them macrosetae, the others shorter, especially along posteroventral margin. Sternum 2 rather uniformly setose, posterior margin deeply emarginate. Female. Tergum 7 small, much narrower than the supra-anal plate, trapezoidal with 2 pairs of very short setae located in the angles in tandem; tergum apparently connected by a narrow sclerotized band to the very short supra-anal plate, which has 4 macrosetae and, on each lateral margin, a shorter seta which is of about same length as the anterior pair of setae on tergum 7. Lateral connexivum with very short, minute setae excepting sometimes 2 or 3 slightly stronger and longer ones that are posterior and somewhat ventral to posterior edge of lateral lobe of tergum 1+2, and a few longer ones at apex of venter. Seventh sternites small, oval, with ± 15 setae, of which about half are macrosetae, the others shorter to short along basal half of sternite. Male. Sternum 5 well developed, the posterior margin slightly emarginate, the discal setae of about the same length as the connexivals; those along posterior margin distinctly longer, becoming even slightly longer laterally. Scutum 6 present, threadlike. Sternum 7+8 with 11 setae; 2 of the more dorsal ones are macrosetae, the rest quite small; tergum 9 with about 16 setae on each side, 2 or 3 of the more dorsal ones macrosetae, the others varying from shorter to short, mostly short.

Postgonites (Fig. 26E) with ventral margins nearly straight, their apices bent slightly downward, with ventral and lateral microsetae and distal sensillae; macroseta of each inserted just anterior to midlength, the accessory seta inserted immediately anterior to macroseta.

Measurements

	Males	Females
BL	1.25-1.45	1.32-1.60
TL	0.45-0.53	0.50-0.54
WL	1.10-1.17	1.21-1.34
WW	0.54-0.60	0.51-0.65

Type Data: Male holotype and female allotype ex *Micronycteris minuta* (SVP 23223), Venezuela, Zulia, 33 km NW La Paz, nr. Cerro Azul, 75 m, 7-VI-68.

Paratypes—VENEZUELA. Apure: 2 males and 1 female ex *Micronycteris minuta*, 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 14-XII-65; 2 females, same host, 0-38 km NNW Pto. Páez, Río Cinaruco, Pto.

Páez, 76 m, 13-I-66. Bolívar: 3 males ex *Micronycteris minuta*, 28 km SE El Manteco, Los Patos, 150 m, 11-IV-66; 1 male ex 1 *Phyllostomus elongatus*, 50 km SE El Manteco, Río Supamo, 150 m, 30-III-66: Guárico: 1 female ex *Micronycteris minuta*, 14 km SE Calabozo, nr. Río Orituco, Est. Biol. de los Llanos, 100 m, 22-VIII-68. Miranda: 5 males ex *Micronycteris minuta*, 7 km E Río Chico, nr. Pto. Tuy, 1 m, 16-17-XI-66. Monagas: 3 females ex *Micronycteris minuta*, 55 km SSE Maturín, Hato Mata de Bejuco, 18 m, 3-VI-68. Sucre: 2 males ex *Micronycteris minuta*, 21 km E Cumaná, 1 m, 22-XII-66. T. F. Amazonas: 1 female ex *Micronycteris minuta*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 18-VII-67. Trujillo: 4 females ex *Micronycteris minuta*, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 3-IX–7-X-65. Zulia: 43 males and 36 females, same host and locality data as for holotype but 75-80 m, 7-15-VI-68; 2 males and 1 female ex *Micronycteris minuta*, 35 km NW La Paz, nr. Cerro Azul, 80 m, 11-VI-68.

Host Associations

Of 109 specimens (58 males and 51 females) of *Trichobius handleyi* collected by the survey teams, 108 (99.1 percent) were from 25 *Micronycteris minuta*.

Remarks

This species is named for my friend and colleague, Dr. Charles O. Handley, Jr., not only to honor his vital role in planning and executing the Smithsonian Venezuelan Project, but also to show appreciation for his personal assistance in many aspects of my studies.

Trichobius urodermae Wenzel

(Fig. 22F, 25I)

Trichobius urodermae Wenzel, 1966:476, Fig. 66B, 68I

Venezuelan Survey Records (17 males, 12 females)

T. F. AMAZONAS: 1 female ex *Uroderma bilobatum*, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 2-II-67; 2 males and 1 female, same host, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 6-I–3-II-67; 2 males and 3 females, same host, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 8-X-67.

TRUJILLO: 2 males and 1 female ex *Uroderma bilobatum*, 56 km WNW Valera, La Ceiba, 29 m, 27-X-65; 1 female, same host, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 7-IX-65.

ZULIA: 1 male ex 1 *Artibeus literatus*, 1 male and 2 females ex *Uroderma bilobatum*, 63 km WNW Encontrados, La Rinconada, El Rosario, 125 m, 27-28-II-68; 1 male, same host, 60 km WNW Encontrados, Boca del Río de Oro, El Rosario, 73 m, 18-III-68; 1 male, same host, 48 km WNW Encontrados, El Rosario, 54 m, 27-II-68; 7 males and 3 females, same host, 42 km WNW Encontrados, El Rosario, 24 m, 4-5-III-68.

Trichobius tiptoni, new species

(Fig. 24D, 26I)

Superficially resembling *Trichobius urodermae* Wenzel but differing in many respects. Setae in general longer than in that species, including the long prescutals and those of antescutellar row, as well as of sternum 2, and the female ventral connexival setae, these mostly no shorter than the shorter basal setae of sternum 2 in *tiptoni*, but only half as long in *urodermae*. Median prescutal setae sparse, 15-20 in number, as opposed to 45-50 in *urodermae*. Eyes small, shorter than greatest width of a laterovertex (coarsely faceted and as long as or longer than width of a laterovertex in *urodermae*). Female tergum 7 transverse, the 2 pairs of setae nearly in a row (trapezoidal with the setae distinctly in tandem in *urodermae*). Seventh sternites of female with only ± 12 setae, as opposed to ± 17 in *urodermae*. Each side of male sternum 7+8 with ± 8-10 setae, mostly macrosetae, and 1 short dorsomedian seta as opposed to 3-5 setae, 2-3 of them macrosetae and 1 short dorso-median seta in *urodermae*. Male postgonites more slender and gradually narrowed distally, the ventral macroseta inserted near midlength (thicker basally, rather suddenly narrowed and curved, the macrosetae inserted farther basad in *urodermae*).

Description

Head. Eyes rather small, with 10 facets, distinctly shorter than greatest width of each laterovertex, these with 5 long, strong, and 1 minute setae; occipital lobes with 7 very strong setae, and 2 short setae below posterior margin. Palpi feebly pointed, their ventral surface setose on a little more than basal half. Theca approximately as broad as long.

Thorax. Anterior margin slightly projecting along middle and slightly emarginate at midline; median suture present on apical half or a little less, transverse suture broadly arcuate or slightly angulate, the middle portion less distinct. Prescutum with 38-42 long setae, most of them long macrosetae, and 15-20 very short median discal setae; those long setae situated anteriorly along midline somewhat shorter in males than in females. Scutum with about 32 discal setae of which several on each side are longer than the median ones, these very short; antescutellar row consisting of 8-10 macrosetae; 4 macrosetae along each lateral margin. Scutellar setae longer than width of scutellum. Mesosternum with strongly oblique lateral margins, anterior margin rather broad, feebly emarginate. Metasternal lobe large, translucent, strongly dorsally reflexed, extending almost halfway to metepimeron.

Wings. Radius and 3rd and 4th longitudinal veins with 2, 3, and 4-5 conspicuous macrosetae, respectively. *Legs.* Outer surface of profemora with short setae which become conspicuously longer apically; dorsal margin with numerous long, strong setae beginning a little before midlength, becoming somewhat shorter distally. Chaetotaxy of midfemora similar. Hindfemora with numerous (20+) macrosetae along dorsal surface, beginning at about basal third.

Abdomen. Lateral lobes of tergum 1+2 with 20-22 setae, most of them strong macrosetae, a few shorter ones along posterolateral margin. Setae of sternum 2 rather uniform throughout. Female. Lateral connexivum with very short setae, these becoming longer ventrally, the ventral ones becoming longer apically. Tergum 7 very short, transverse, with 2 pairs of short setae in tandem, the anterior pair slightly longer and more widely separated. Supra-anal plate very short with 4 distal macrosetae and, on each side, an additional strong seta that is about half as long as distal macrosetae. Seventh sternites oval, with ± 12 setae, those on inner half conspicuously shorter than those on outer half, several of these being macrosetae, one of them conspicuously longer than the others. Male. Sternum 5 rather long, slightly narrowed at middle, setae more or less uniform except that those along distal margin become conspicuously longer toward sides. Sternum 6 almost threadlike. Each side of sternum 7+8 with 8-10 strong setae, most of them macrosetae, and 1-2 very short dorsomedial seta; each side of tergum 9 with ± 13 strong setae, mostly macrosetae arranged in 2 rows. Postgonites twisted to the left, in lateral profile appearing to have apices ventrally curved; the ventral margins with a row of fine setae.

Measurements

	Males	Females
BL	1.30-1.60	1.39-2.00
TL	0.53-0.60	0.56-0.68
WL	1.39-1.63	1.58-1.80
WW	0.62-0.74	0.63-0.82

Type Data: Male holotype and female allotype ex *Anoura caudifer* (SVP 34187), Venezuela, Barinas, 2 km SW Altamira, Altamira, 609 m, 4-I-68. Paratype—Barinas: 14 males, 11 females and 1 sex undet. ex *Anoura caudifer*, 1 male ex 1 *Sturnira ludovici*, 1 male ex 1 *Desmodus rotundus*, same locality as holotype but 609-620 m, 26-XII-67—4-I-68; 1 female ex 1 *Carollia perspicillata*, 4 males and 8 females ex *Anoura caudifer*, Altamira, 600-794-m, 13-20-XII-67; 2 males, same host, 7 km NNE Altamira, Altamira, 1,070 m, 26-XII-67. Bolívar: 7 males and 7 females ex *Anoura caudifer*, 85 km SSE El Dorado, km 125, 826-1,165 m, 10-23-V-66. Carabobo: 4 males ex *Anoura caudifer*, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 30-XI—1-XII-67. Dto. Federal: 1 male ex *Anoura caudifer*, 4 km NNW Caracas, Los Venados, 1,498 m, 23-VII-65. Miranda: 1 male ex *Anoura caudifer*, Birongo, 60 m, 22-I-68; 4 males and 2 females, same host, 5 km NNW Guarenas, Curupao, 1,140-1,180 m, 13-X-66; 2 males, same host, 16 km SSE Caracas, San Andres, 950 m, 30-XII-65. Yaracuy: 2 males and 2 females ex *Anoura caudifer*, 1 female ex 1 *Vampyrops helleri*, 20 km NW San Felipe, Minas de Aroa, 400 m, 6-21-XII-67.

Host Associations

Of 77 specimens (44 males and 33 females) of *Trichobius tiptoni* collected by the survey teams, 73 (94.8 percent) were from 40 *Anoura caudifer*, the other 4 ex 4 different species of bats, some of them certainly contaminants, others perhaps transitory transfers.

Remarks

It should be noted that in some specimens the innermost 3 setae along the posterior margin of each occipital lobe are arranged on a distinctive slightly elevated flap reminiscent of the posterior flaps in *Exastinion*, which are also parasites of *Anoura*. This cannot be detected in most slide preparations but can be seen in liquid-preserved specimens, if the head is tilted slightly upward.

This species is named for my friend and colleague, Dr. Vernon J. Tipton, whose energies and dedication, together with his understanding of goals and logistics, have played a major role in the successful execution of the Smithsonian Venezuelan Project.

Trichobius angulatus, new species
(Fig. 24A, 26B)

Females of *Trichobius angulatus* n. sp. are virtually indistinguishable from those of *T. intermedius* Peterson and Hurka (1975:1049), which is known from West Indies and Central America (Mexico to El Salvador), chiefly on various races of *Artibeus jamaicensis;* but the setation of the undersides of the palpi is slightly more extensive (only on about basal half in that species), and the seta on or near each lateral margin of the supra-anal plate is very short, of about same length as shorter setae of tergum 7. In *intermedius* this seta is generally noticeably longer, though not as long or as strong as it is in *T. assimilis* n. sp. The males, however, may be easily separated from those of *intermedius* by their more slender, strongly curved postgonites (Fig. 26B).

Description

Head. Eyes with 11 large facets. Laterovertices each with 5 strong setae; occipital lobes each with 7 very strong setae (mostly macrosetae) and 2 very short setae along posterior margin. Palpi with apical margins oblique and emarginate between the long distal macroseta and the next most mesal seta; undersides setose on about apical ⅔ or ¾.

Thorax. Anterior margin subtruncate, usually feebly broadly arcuate, and slightly emarginate at midline. Median suture strong on anterior half or slightly more; transverse suture strongly angulate, less distinct along middle. Prescutum with a median discal area of approximately 41-45 short setae in the male, and 34-35 in the female, and 28-34 long prescutal setae anteriorly and along sides. Scutum with from 39-48 short setae and a row of 8-10 antescutellars, most of these 2-3 times as long as the discal setae, and a long macroseta at each end of row. Scutellar setae very long, longer than scutellum is wide. Mesosternum with strongly oblique lateral margins, anterior margin slightly emarginate. Metasternal lobe broad, translucent, slightly bent upwardly.

Wings. Without distinctive characters. *Legs.* as in *T. intermedius* Peterson and Hurka.

Abdomen. Lateral lobes of tergum 1+2 with from 11-15 setae, a few of them, especially ventrally, small, most of them very short, and most of them macrosetae. Sternum 2 with rather uniform setae excepting that they become longer laterally and especially around the lateral angles where there is a cluster of stronger, longer setae. Female. Lateral connexival setae very short, except for a cluster of from 5-8 setae that are conspicuously longer and coarser behind and slightly ventrad to the lateral lobes of tergum 1+2. Tergum 7 very small, either transverse or sometimes trapezoidal, much narrower than the supra-anal plate, with 2 pairs of setae in tandem, the anterior pair farther apart and longer and stronger; supra-anal plate with 4 distal macrosetae and on each lateral margin a very short weak seta only slightly longer than the short setae on tergum 7. Seventh sternites with 10-11 setae each, including several smaller ones basally and at least 3 or 4 macrosetae distally, one of these conspicuously longer than the others. Male. Sternum 5 well developed, rather evenly setose, most setae of about the same size as the ventral connexival setae, those along middle of apical margin slightly longer, becoming conspicuously longer laterally where several are 2 or 3 times as long as the discal setae. Sternum 6 present. Sternum 7+8 with 4 or 5 setae, two of them conspicuously long macrosetae; tergum 9 with about 10-11 setae on each side, of which the mostly ventral and anterior ones are rather short and several of the lateral ones are conspicuous macrosetae.

Measurements

	Males	Females
BL	1.79-1.92	1.96-2.13
TL	0.69-0.71	0.73-0.78
WL	1.58-1.71	1.76-1.86
WW	0.79-0.84	0.81-0.85

Type Data: Male holotype (SVP 8571) and female allotype (SVP 8845) ex *Vampyrops aurarius*, Venezuela, Bolívar, 85 km SSE El Dorado, Km 125, 1,032 m, 20-V-66. Paratypes—VENEZUELA. Bolívar: 11 males and 8 females, same host and locality data as holotype but 889-1,165 m, 23-III—26-V-66. T. F. Amazonas: 4 males and 1 sex undet. ex *Vampyrops aurarius*, Caño Culebra, 50 km NNW Esmeralda, Cerro Duida, 700-800 m, 17-19-I-67.

Trichobius assimilis, new species
(Fig. 24B, 26A)

The description of *Trichobius angulatus* applies almost equally well to *T. assimilis.* The most distinctive differences are in the setation of the palpi (setae present on basal half of underside or less, rather than on slightly more than apical half); the strong seta on each side of the female supra-anal plate; and the short and slender, less abruptly curved male postgonites.

Both species are extraordinarily close to *T. intermedius*, which also has a very strongly angulate transverse mesonotal suture and like *assimilis* and *angulatus* appears to be parasitic primarily on *Artibeus jamaicensis*. In *intermedius* the seta on each side of the supra-anal plate is much shorter, and, more importantly, the male postgonites are much heavier and not as strongly curved.

Description

Almost identical to *Trichobius angulatus* in most characters, except as follows: undersides of palpi setose on basal half or less; the prescutum with more numerous short, median-discal setae (40-50 in the males, as many as 60 in 1 female), these generally slightly longer than in *angulatus;* scutum with 39-43 short setae; antescutellar row of setae generally more consistently composed of longer setae (whereas there is often an admixture of longer and shorter ones in *angulatus*). Female. Supra-anal plate with a strong seta on each side, this ⅓ to ½ as long as the distal macrosetae. Seventh sternites with 12-15 setae, mostly stronger and longer than in *angulatus*, about half of them conspicuously longer, stronger macrosetae. Male. Postgonites rather long and slender (Fig. 26A), similar to those of *angulatus*, but not as strongly curved.

Measurements

	Males	Females
BL	1.92-2.15	1.95-2.32
TL	0.68-0.78	0.81-0.87
WL	1.55-1.77	1.82-1.92
WW	0.75-0.86	0.90-0.95

Type Data: Male holotype and female allotype ex *Artibeus* sp. D (SVP 22086), Venezuela, Zulia, 21 km SW Machiques, Kasmera, 270 m, 15-IV-68. Paratypes—VENEZUELA. Bolívar: 3 males and 2 females ex *Artibeus jamaicensis*, 21 km NE Icabarú, El Pauji, Icabarú, 851 m, 7-9-V-68; 1 male, same host, 28 km NE Icabarú, Icabarú, 775 m, 28-IV-68; 7 males and 3 females, same host, and 1 male ex 1 *Vampyrops aurarius*, 85 km SSE El Dorado, Km 125, 826-1,032 m, 19-19-V-66. T. F. Amazonas: 3 males and 1 female ex *Artibeus jamaicensis*, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 12-I—2-II-67; 3 males and 1 female, same host, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 10-I—3-II-67; 10 males and 3 females, same host, Cabecera del Caño Culebra, 40 km NNW Esmeralda, 1,140 m, 2-7-II-67. Zulia: 4 males and 4 females, same data as the holotype.

Host Associations

Of 48 specimens (33 males and 15 females) of *Trichobius assimilis* that were collected by the survey teams, 37 (77 percent) were from 21 *Artibeus jamaicensis* and 10 (20.8 percent) from 2 *Artibeus* "sp. D." The single specimen from *Vampyrops aurarius* is probably a contaminant from specimens of *A. jamaicensis* that were apparently collected at the same time.

Trichobius sp.

A male and female from *Micronycteris megalotis* closely resemble *T. joblingi*. The female has a small cluster of coarser setae behind the lateral lobes of tergum 1 + 2, as in that species, but the setae of tergum 7 resemble those of *dugesii*. The male postgonites are similar to those of *joblingi* but appear to be nearly symmetrical and are not strongly twisted to the left as in *joblingi*. These specimens may represent a distinct species.

Venezuelan Survey Records

T. F. AMAZONAS: 1 male and 1 female ex *Micronycteris megalotis* (SVP 30914), 20 km S Pto. Ayacucho, Las Queseras, Pto. Ayacucho, 135 m, 24-IX-67.

Trichobius parasiticus complex

Trichobius dugesioides Wenzel

(Fig. 4C. 24E, F; 25D)

Trichobius dugesioides Wenzel, 1966:488, Fig. 68D, 71

Venezuelan Survey Records (405 males, 342 females, 1 sex undet.)

APURE: 1 male and 2 females ex *Carollia perspicillata*, 2 males ex *Trachops cirrhosus*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 22-31-I-68; 1 male ex 1 *Macrophyllum macrophyllum*, 24 males and 8 females ex *Trachops cirrhosus*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 23-28-XII-65; 4 males and 4 females, same host, 3 females ex 2 *Desmodus rotundus*, 46 km NE Pto. Páez, Río Cinarueo, Hato Cariben, 76 m, 14-27-XII-65.

BARINAS: 4 males and 1 female ex *Carollia perspicillata*, 2 km SW Altamira, Altamira, 611-620 m, 27-XII-67—4-I-68; 1 male and 1 female, same host, 1 female ex 1 *Carollia brevicauda*, 7 km NNE Altamira, Altamira, 1,070 m, 25-XII-67; 2 males and 1 female ex *Carollia perspicillata*, Altamira, 794 m, 13-XII-67—9-I-68.

BOLÍVAR: 1 female ex *Carollia perspicillata*, 21 km NE Icabarú, El Pauji, Icabarú, 851 m, 2-V-68; 1 male and 2 females, same host, 23 km NE Icabarú, El Pauji, Icabarú, 824 m, 28-29-IV-

68; 1 male and 3 females, same host, 2 males and 3 females ex *Trachops cirrhosus*, 45 km NE Icabarú, Santa Lucia de Surukun, Icabarú, 851 m, 30-IV–2-V-68; 8 males and 2 females, same host, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 14-23-VI-66; 6 females, same host, 20 km W La Paragua, Hato San José, 306 m, 6-III–10-IV-67; 1 female, same host, 5 males ex *Phyllostomus elongatus*, 50 km SE El Manteco, Río Supamo, 30-III–10-IV-66; 1 female, same host, 70 km SSE El Dorado, Piedra Virgen, Km 125, 229 m, 29-V-66; 2 females, same host, 25 km SE El Manteco, Los Patos, 150 m, 5-IV-66.

CARABOBO: 13 males and 14 females ex *Trachops cirrhosus*, 6 km N Urama, 60 m, 17-III-66.

FALCÓN: 2 females ex *Carollia perspicillata*, 16 km ENE Mirimire, nr. La Pastora, 70 m, 28-30-XI-67; 4 males and 1 female ex 2 *Chiroderma villosum*, 9 males and 12 females ex *Chrotopterus auritus*, 1 male and 1 female ex 2 *Sturnira lilium*, 58 males and 50 females ex *Trachops cirrhosus*, 19 km NW Urama, Km 40, Urama, 25 m, 18-X–3-XI-65.

GUÁRICO: 38 males and 36 females ex *Trachops cirrhosus*, 14 km SE Calabozo, nr. Río Orituco, Est. Biol. de los Llanos, 100 m, 22-VIII-64–22-VIII-68.

T. F. AMAZONAS: 2 males and 1 female ex *Trachops cirrhosus*, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 20-II-66; 3 males and 3 females, same host, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 30-V–2-VI-67; 3 males and 8 females, same host, 14 km SSE Pto. Ayacucho, El Gavilan, Pto. Ayacucho, 135 m, 11-X-67; 4 females, same host, 1 male ex *Carollia perspicillata*, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 7-IX-67; 1 male, same host, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 12-I-67; 5 males, same host, 1 male ex *Chrotopterus auritus*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 10-15-I–9-II-67; 1 male ex *Carollia perspicillata*, 20 km S Pto. Ayacucho, Las Queseras, Pto. Ayacucho, 135 m, 27-IX-67; 4 males and 5 females ex *Trachops cirrhosus*, 33 km S Pto. Ayacucho, El Raudal, Pto. Ayacucho, 195 m, 20-IX–5-X-67; 1 male ex 1 *Phyllostomus hastatus*, 1 male ex *Phyllostomus elongatus*, Río Orinoco, Tamatama, 135 m, 28-IV–8-V-67; 1 male ex 1 *Tonatia silvicola*, 1 female ex 1 *Phyllostomus discolor*, 1 male ex 1 *Sphaeronycteris toxophyllum*, 100 males and 82 females ex *Trachops cirrhosus*, 5 males and 6 females ex *Carollia perspicillata*, 1 female ex *Phyllostomus elongatus*, 2 males ex *Chrotopterus auritus*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-14-IV-67; 48 males, 46 females and 1 sex undet. ex *Trachops cirrhosus*, 1 male ex *Phyllostomus elongatus*, 13 males and 6 females ex *Chrotopterus auritus*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 5-27-VII-67.

TRUJILLO: 1 male ex *Chrotopterus auritus*, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 6-X-65; 2 males ex *Trachops cirrhosus*, 23 km NNW Valera, Río Motatan, Valera, 90 m, 8-X-65; 2 males, same host, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 22-X-65.

YARACUY: 1 male and 3 females ex *Trachops cirrhosus*, 11 km NW Urama, El Central, Urama, 25 m, 15-III-66; 2 females ex *Carollia perspicillata*, 20 km NW San Felipe, Minas de Aroa, 395-400 m, 7-13-XII-67.

YARACUY/CARABOBO: 4 males and 1 female ex *Chrotopterus auritus*, 10 km NW Urama, Urama, 25 m, 17-X-65.

ZULIA: 4 males and 1 female ex 3 *Carollia*, 2 males ex *Carollia perspicillata*, 21 km SW Machiques, Kasmera, 270 m, 15-22-IV-68; 1 female, same host, 14 males and 11 females ex *Trachops cirrhosus*, 60 km WNW Encontrados, Boca del Río de Oro, El Rosario, 73 m, 17-18-III-68; 1 male ex *Carollia perspicillata*, 39 km WNW Encontrados, El Rosario, 37 m, 31-III-68; 1 female, same host, 48 km WNW Encontrados, El Rosario, 54 m, 25-II-68; 1 male, same host, 63 km WNW Encontrados, La Rinconada, El Rosario, 125 m, 28-II-68.

HOST ASSOCIATIONS

Of 747 specimens of *Trichobius dugesioides* collected by the survey teams, 616 (82.5 percent) were from 112 *Trachops cirrhosus*, 49 (6.5 percent) ex 10 *Chrotopterus auritus*, 50 (6.7 percent) ex 40 *Carollia perspicillata*, 11 (1.47 percent) ex 8 *Phyllostomus elongatus*. The remaining 21 were from 10 bats of 10 different species; while many of these undoubtedly represent transitory transfers and perhaps some contamination, the records from *P. elongatus* probably represent facultative parasitization. For a discussion of the occurrence of *dugesioides* on *C. perspicillata* in Panama, see Wenzel et al. (1966:490, 645).

Trichobius tuttlei, new species

(Fig. 23E, 26H)

Females of *tuttlei* are easily separated from similar species by the short transverse tergum 7, which is much narrower than the proctiger, and especially by the possession of only 3 instead of 4 distal macrosetae on the supra-anal plate. Males are distinct from *ethophallus* in having only 7-9 setae on each side of sternum 7+8 (16-17 in *ethophallus*) and from both *dugesioides* and *flagellatus* in having 11-12 setae on each side of tergum 9 (18-20 in *dugesioides* and *flagellatus*); the postgonites resemble those of *dugesioides*.

Description

Head. Eyes with about 10 facets of moderate size, their length approximately equal to greatest length of occipital lobes, but less than greatest width of each laterovertex, each of these with the usual 5 strong and 1 minute setae along anterior margin; each occipital lobe with 7 strong and 2 minute setae along posterior margin. Palpi suborbicular, rather densely closed beneath with strong setae, these minute basally, becoming distinctly longer apically, the distal macroseta slightly longer than palpus. Theca approximately as broad as long.

Thorax. Anterior margin slightly projecting at middle and slightly notched at midline; median suture extending to about midlength, transverse suture distinctly angulate, the median portion transverse and less distinct; microtrichia of mesonotum restricted to margins of notopleural suture. Prescutum with 32-34 long setae in a couple of rows across anterior ⅔ and along sides; median discal area with ± 36 shorter setae, these distinctly longer laterally and anteriorly, somewhat denser at middle; scutum with ± 36 setae of about same length as those in median area of prescutum, a row of about 10 short antescutellar setae of approximately the same length, and an additional very long seta on each side, this about half as long as outer pair of scutellar setae; sides of scutum with the usual 4 macrosetae. Scutellum with 4 macrosetae, the 2 median ones distinctly longer. Mesosternum rather broad between coxae, sides strongly oblique, anterior margin subtruncate, feebly arcuately emarginate; metasternal lobe absent. *Wings* and *Legs* very much as in *flagellatus* and ethophallus, without distinctive characters.

Abdomen. Lateral lobes of tergum 1+2 with ± 24 setae, those along posterolateral margin short or of intermediate lengths, the more anterodorsal and posterior setae strong, very long, but without conspicuously long macrosetae. Sternum 2 rather evenly setose, the setae along middle of posterior margin about as long as the discals, becoming conspicuously longer laterally and in posterolateral angles. Female. Lateral connexival setae minute along inner margins of setose area, becoming longer along lateral margins where they are of about the same length of those ventral connexivum. Tergum 7 transversely trapezoidal, with 2 pairs of rather widely separated setae in tandem, the anterior pair longer; it is not clear from the slide preparation whether it is connected by a strap to the supra-anal plate or not; in one anomalous specimen there are 2 additional setae, 1 very long and strong, the other shorter, to the left of tergum 7. Supra-anal plate rather narrow with only 3 distal macrosetae, without setae along lateral margins. Seventh sternites very small, scarcely wider than supra-anal plate, with only ± 10 setae, two of those along anterior margin being macrosetae, the rest much shorter, including several which are about the same length as the distal connexival setae. Male. Sternum 5 well developed, broad, and fairly long, the discal setae rather uniformly covered with setae similar to those of the ventral connexivum, those along distal margin distinctly longer, at least 4 or 5 of those along distal margin and sides conspicuously long, twice or more as long as the discals. Sternum 7+8 with 8 setae of varying lengths, mostly slender, one of the dorsal ones a conspicuous macroseta; tergum 9 with ± 10-11 setae, several of the dorsal ones conspicuously longer macrosetae. Postgonites nearly straight, slightly bent at apices; sides and ventral margins with numerous denticlelike setae; ventral macroseta inserted quite far posteriorly, the accessory seta nearly half as long and placed close to and anterior to the macroseta. Aedeagus narrowly ribbonlike.

Measurements

	Males	Females
BL	1.56	1.70-1.78
TL	0.52	0.58-0.61
WL	1.31	1.50-1.51
WW	0.68	0.72-0.73

Type Data: Male holotype and 2 female paratypes ex 1 *Micronycteris brachyotis* (SVP 18706), Venezuela, T. F. Amazonas, Río Orinoco, Tamatama, 135 m, 4-V-67.

Remarks

This species is named to show appreciation for the remarkable field accomplishments of Arden L. and Merlin D. Tuttle, survey team leaders, and other members of their group.

Trichobius ethophallus, new species

(Fig. 23D, 26F)

Closely resembling *Trichobius dugesioides*, *T. flagellatus*, and *T. tuttlei* in most characters. Females may be separated from these and other species of the *parasiticus* complex by the very large tergum 7 which bears 13-17 setae (typically 2 pairs in other species). Males may be separated by the numerous setae (16-17) on each side of sternum 7+8, there being 8-9 in *dugesioides*, *flagellatus*, and *tuttlei*. The strongly curved apices of the postgonites are also distinctive.

DESCRIPTION

Head. Eyes very small, longer than wide, transverse, with 8 facets, approximately as long as greatest length of each occipital lobe, and ¾ the width of each laterovertex, these each with 4 strong and 2-3 very short, stout setae, one of these on apical margin, the other 1 or 2 inserted near the strong seta in posteriomedial angle; each occipital lobe with 7 strong setae, and 2 microsetae along posterior margin. Palpi subovate, anterior margins rounded, undersides with rather sparse, short, conspicuous setae, distal macroseta about as long as width of palpus, sometimes as long as palpus. Theca longer than broad; posterior margin of oral cavity rounded.

Thorax. Anterior margin distinctly, broadly, projecting at middle, and sometimes feebly emarginate at midline; median suture extending less than half the length of prescutum, transverse suture feebly arcuate, less well defined along middle. Microtrichia present along edge of notopleural suture, those of prescutum extending medially to enclose the 2 posterior, long, marginal setae; those on scutum restricted to margins of suture. Prescutum with 32-34 long setae, mostly macrosetae, and 22-25 shorter median discal setae, some of these becoming longer laterally and anteriorly. Scutum with 40-52 short discal setae similar to the median discals of prescutum, and with the usual 4 macrosetae along lateral margins; setae of antescutellar row only slightly longer than the setae anterior to them, a long seta at each end of row.

Mesosternum rather broadly produced between front coxae, the sides strongly oblique, anterior margin broadly rounded or subtruncate, sometimes slightly indented at middle. Metasternal lobe absent, though in some specimens there appears to be a trace of a translucent margin.

Wings. Without distinctive characters. *Legs.* Outer face of femora clothed with short setae, upper surface of profemora with approximately 10 strong setae on distal ⅔ and a row of 4-5 short strong setae basally; midfemora above with only 4 or 5 fairly long setae on a little more than distal third, and a few shorter ones intermingled with them and with the short setae along sides; hindfemora with about 10 macrosetae above and on each side of these a row of shorter, strong, erect setae.

Abdomen. Lateral lobes of tergum 1+2 with ± 28 setae, the dorsal ones stronger and longer, becoming shorter to short ventrolaterally. Sternum 2 evenly setose. FEMALE. Lateral connexivum with a large cluster of 10-12 or more setae which, though not strikingly long, are conspicuously longer than the very minute lateral connexival setae posterior to them; this cluster merges ventrally with the ventral connexival setae; distally the lateral setae become longer and similar to the ventral ones. Tergum 7 very large, oblong or suborbicular with 13-17 setae, continuous with and wider than the supra-anal plate, this with 4 distal macrosetae, another row of 4 strong setae along base, and a strong seta along each lateral margin. Seventh sternites oval, transverse, rather small with ± 22 setae, those along posterior margin and lateral edge longer, one—near outer margin at middle—longer than the rest, about as long as sternite, the other strong setae shorter; setae along middle of disc and anterior margin very short, about as long as ventral connexival setae. MALE. Lateral connexival setae of male dense, about twice as long as those on venter. Sternum 5 rather evenly clothed with setae of about same size as those on adjacent connexivum excepting along posterior margins where they are longer, becoming about twice as long toward sides. Sternum 6 absent. Sternum 7+8 with 16-17 setae on each side, a few short, 1 distinctly longer than the others; tergum 9 with ± 23 strong setae, those along dorsal and posterior margins longer, the others becoming shorter. Postgonites symmetrical, rather slender, apices rather strongly curved; ventral accessory seta inserted far anterior to the macroseta, the ventral margins and sides clothed with numerous denticles. Aedeagus ribbonlike.

MEASUREMENTS

	Males	Females
BL	1.10-1.30	1.12-1.60
TL	0.38-0.49	0.43-0.51
WL	1.03-1.29	1.01-1.29
WW	0.45-0.73	0.52-0.66

TYPE DATA: Male holotype ex *Lonchorhina orinocensis* (SVP 5840), Venezuela, Apure, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 24-XII-65. Female allotype, same host (SVP 5786) and locality data except 23-XII-65. PARATYPES—APURE: 250 males, 152 females, and 1 sex undet., same host and locality data as holotype but 6-28-XII-65; 7 males and 1 female, same host, 1 km W Pto.

Páez, Cerro de Murcielagos, Pto. Páez, 76 m, 19-24-I-66. T. F. Amazonas: 2 males and 1 female ex *Lonchorhina orinocensis*, 20 km S Pto. Ayacucho, Las Queseras, Pto. Ayacucho, 135 m, 21-IX-67; 2 males, same host, 30 km S Pto. Ayacucho, Coromoto, Pto. Ayacucho, 126 m, 8-X-67; female, same host, 30 km S Pto. Ayacucho, Guayabal, Pto. Ayacucho, 135 m, 12-X-67.

Trichobius flagellatus, new species

(Fig. 23F, 26C, D)

Females of *Trichobius flagellatus* may be distinguished from *T. ethophallus* n. sp. and other similar species by the conspicuous area of very minute setae on the lateral connexivum behind lateral lobes of tergum 1 + 2, followed by abruptly longer setae. As in *dugesioides*, tergum 7 is trapezoidal, but whereas it is nearly as wide as the proctiger in *flagellatus*, it is distinctly narrower in *dugesioides*. Males can easily be identified, even most alcohol-preserved specimens, by the extraordinarily long, whiplike aedeagus (hence the name) and the unusually long, slender, curved postgonites.

Description

Head. Eyes transverse, with 9 facets, their length slightly less than greatest width of each laterovertex, these with 5 strong and 1 very short setae on anterior margin; occipital lobes each with 7 strong setae, and 2 short setae along posterior margin. Palpi subovate, the distal macroseta as long as or slightly longer than palpus. Theca approximately as wide as long.

Thorax. Anterior margin straight or feebly produced at middle, the median suture present on slightly less than apical half, the transverse suture feebly angulate, somewhat indistinct at middle. Mesonotal microtrichia distributed as in *T. ethophallus* n. sp. Prescutum with approximately 36 macrosetae anteriorly and along lateral margins; middle of disc with ± 32 shorter setae, none conspicuously short, and becoming slightly longer anteriorly and laterally. Scutum with ± 40 discal setae of approximately same length as median discals of prescutum; setae of antescutellar row almost twice as long as discal setae, and with a much longer seta on each side; 4 macrosetae along each lateral margin. Mesosternum rather broad between the coxae, sides strongly oblique, anterior margin truncate or feebly emarginate.

Wings. Without distinctive characters. *Legs.* Rather short, femora stout; profemora rather evenly clothed with short setae on outer face, dorsal surface with 12-15 longer setae of varying lengths, mostly on about apical ⅔; midfemora with 4-5 conspicuously longer setae on less than apical half of upper surface and 6-8 that are shorter than these but longer than those on lateral surface; hindfemora clothed with numerous long setae on upper surface, especially distal ⅔, a few as long as femur is wide.

Abdomen. Lateral lobes of tergum 1 + 2 with ± 24 setae, those along ventrolateral margin mostly short, the others mostly macrosetae. Sternum 2 rather uniformly covered with setae that are slightly longer than those on adjoining connexivum; setae along middle of posterior margin of approximately the same length as the discals but becoming conspicuously longer toward sides and in lateral angles. Female. Lateral abdominal connexivum sometimes with a couple of strong short setae behind lateral lobes of tergum 1 + 2, but otherwise virtually devoid of setae basally except for extremely minute microsetae, these followed on apical half of abdomen by much longer setae, a few shorter ones along inner margin of setose area; the lateral setae distinctly longer than those on venter. Tergum 7 small, trapezoidal, longer than wide, with 2 pairs of widely separated setae in tandem, the anterior pair longer; narrower than and apparently united with the supra-anal plate, the juncture marked by a groove. Supra-anal plate with 4 distal macrosetae, lacking setae on base or margins. Seventh sternites very small, scarcely wider than supra-anal plate, with ± 19 setae, only 1 a conspicuous macroseta, this as long as those of supra-anal plate, the others mostly strong along distal and lateral margins, shorter on disc and anterior margin. Male. Lateral connexival setae of male rather dense, long and moderately coarse, longer than the ventrals. Sternum 5 well developed, the discal setae about as long as those on venter but those on posterior margin, even those at middle, approximately twice as long as the discals and toward the sides and in posterolateral angles, becoming about 2½ to 3 times as long as the discals, the lateral ones being macrosetae. Sternum 6 absent, 7 + 8 with 8-9 strong, mostly long setae on each side, including strong macroseta, the most dorsomedial one quite short, the others of varying lengths, tergum 9 with 22-25 setae on each side, a couple of them macrosetae, the others of varying lengths, but all strong and none minute. Postgonites slender throughout length, rather evenly curved, the accessory seta inserted far anterior to the macroseta and quite long; with a microseta inserted above accessory seta, a couple near midlength on ventral margin, and, distal to these, a series of sensillae on margin and apices. Aedeagus long, coiled, flagelliform.

Measurements

	Males	Females
BL	1.33-1.44	1.32-1.63
TL	0.44-0.51	0.50-0.53
WL	1.13-1.27	1.27-1.35
WW	0.56-0.65	0.62-0.69

Type Data: Male holotype (SVP 2563) and female allotype (SVP 2554) ex *Lonchorhina aurita*, Venezuela, Trujillo, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 3-IX-65. Paratypes—Barinas: 1 male ex *Lonchorhina aurita*, 7 km NNE Altamira, Altamira, 1,070 m, 25-XII-67. Bolívar: 8 males and 6 females ex *Lonchorhina aurita*, 20 km W La Paragua, Hato San José, 300 m, 8-IV-67. Dto. Federal: 1 male and 2 females ex *Lonchorhina aurita*, nr. El Limón, 48 km W Caracas, Hda. Carapiche, 380-398 m, 21-VIII-66. Miranda: 1 male and 2 females ex *Lonchorhina aurita*, 4 km SW Birongo, Cueva Walter Dupouy, Birongo, 195 m, 28-I-68; 5 males and 9 females, same host, Birongo, 60 m, 22-23-I-68. T. F. Amazonas: 1 male and 1 sex undet. ex *Lonchorhina orinocensis*, 25 km S Pto. Ayacucho, Paria, Pto. Ayacucho, 114 m, 13-IX-67; 1 male ex *Lonchorhina aurita*, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 6-II-67; 1 male and 1 female, same host, 84 km SSE Esmeralda, 7 km up Río Mavaca, 138 m, 2-III-67.

Host Associations

Of 55 specimens of *Trichobius flagellatus* collected by the survey teams, 53 (96 percent) were from 19 *Lonchorhina aurita* and 2 ex 2 L. orinocensis.

Trichobius diphyllae Wenzel

(Fig. 23B, 25B)

Trichobius diphyllae Wenzel, 1966:492, Fig. 68B, 73B

This species was not collected by the survey teams, but the original series included 7 paratypes collected from *Diphylla ecaudata* at Rancho Grande (El Limón), Aragua.

Trichobius diaemi, new species

(Fig. 23C, 26J)

Very similar to *Trichobius parasiticus* Gervais, but differing in mesonotal chaetotaxy in that scattered, short, discal setae are present on prescutum anterior to the row in front of the transverse suture (rarely a couple of such setae in *parasiticus*); in having scattered discal setae on the scutum in front of the W-shaped antescutellar row; and in lacking a cluster of prominent setae on sides of the male postgonites.

Description

Head. With the characters of *T. parasiticus* Gervais, except as follows: *Thorax.* Prescutum without a short seta on each side of median suture behind anterior margin (usually present in *parasiticus*); median setae of transverse row in front of suture not noticeably longer or set apart from other setae of this row (4-5 of them somewhat longer in *parasiticus*), 2 setae at each end of this row strong and coarse (only 1 in *parasiticus*); scattered discal setae nearly always present on scutum (not so in *parasiticus*), the W-shaped transverse row of antescutellar setae usually consisting of more than a single row (sometimes irregular and appearing double at middle in *parasiticus*). Microtricha of mesonotum as in *parasiticus;* that is, present as a longitudinal band along lateral margins, this band enclosing the marginal macrosetae and usually extending to or enclosing the second seta from lateral margin as well, and extending along anterior margin about half-way to median suture; microtrichia along lateral edges of scutum enclosing the marginal setae. Male. Postgonites (Fig. 26J) bladelike as in *parasiticus* (Fig. 25A) but not quite as wide, lacking the cluster of prominent setae above the ventral macroseta but with numerous thornlike setae or denticles in conspicuous sockets, on a little more than distal half of lateral face.

Measurements

	Males	Females
BL	1.16-1.48	1.16-1.59
TL	0.39-0.49	0.44-0.54
WL	0.94-1.23	1.09-1.21
WW	0.49-0.73	0.55-0.82

Type Data: Male holotype and female allotype ex *Desmodus youngii* (SVP 26861), Venezuela, T. F. Amazonas, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 17-18-VII-67. Paratypes—Sucre: 3 males and 1 female ex *Desmodus youngii*, 21 km E Cumaná, 1 m, 21-23-XII-66; 17 males and 15 females, same host, 9 km NE Güiria, Ensenada Cauranta, 4 m, 5-VI-67. T. F. Amazonas: 5 males and 4 females ex *Desmodus youngii*, 14 km SSE Pto. Ayacucho, Chaparito, Pto. Ayacucho, 119 m, 2-X-67; 28 males, 14 females, and 5 sex undet., same host, 28 km S Pto. Ayacucho, Guayabal, Pto. Ayacucho, 135 m, 7-X-67; 9 males and 9 females, same host and locality data as holotype. COLOMBIA: 2 males ex "*Diaemus youngi*," Guainia, nr. Amanaven, 7-IX-67, C. J. Marinkelle.

OTHER MATERIAL EXAMINED
TRINIDAD: 1 female "ex *Diaemus*," Greenhall; 1 female, St. Patrick Co., Siporia, Alta Graces Trace, XII-54.

Trichobius parasiticus Gervais

(Fig. 23A, 25A)

Trichobius parasiticus Gervais, 1844:14, Pl. 43, Fig.—Wenzel, Tipton, and Kiewlicz, 1966: 494, Fig. 68A, 73A

Trichobius kesseli Guimarães, 1938:660, Fig. 9 (nom. nov., in error)

VENEZUELAN SURVEY RECORDS (2,636 males, 1,624 females, 20 sex undet.)

This well-known species occurs on the vampire bat, *Desmodus rotundus*, throughout its range.

To briefly summarize, the survey teams collected this fly at 75 localities in 17 states as follows: Apure (6 localities, 24-76 m); Barinas (3 localities, 611-1,070 m); Bolívar (2 localities, 300-1,032 m); Carabobo (4 localities, 25-1,537 m); Dto. Federal (2 localities, 1,507-2,240 m); Falcón (5 localities, 2-470 m); Guajira (1 locality, 15 m); Guárico (3 localities, 100-181 m); Lara (1 locality, 580 m); Miranda (7 localities, 1-570 m); Monagas (3 localities, 18-1,180 m); Nueva Esparta (8 localities, 1-53 m); Sucre (6 localities, 1-380 m); T. F. Amazonas (12 localities, 119-161 m); Trujillo (7 localities, 29-164 m); Yaracuy (1 locality, 25 m); Zulia (4 localities, 15-270 m).

HOST ASSOCIATIONS
Of, 4,280 specimens of *Trichobius parasiticus* collected by the survey teams, 4,146 (96.8 percent) were from 91 *Desmodus rotundus*. The remaining 135 specimens were from 38 bats of 21 species, and, although many of these are clearly transitory associations and contaminations, this number is not surprising. In general (see Wenzel et al., 1966:638-641), the larger the series of bats collected, especially of species which roost in or near a wide variety of other species, the greater will be the number of parasite records representing disturbance and other transitory transfers and contaminants. Some records are puzzling, e.g., the 17 specimens from 2 *Vampyrops umbratus*, 16 ex 1 *Chiroderma villosum*, and 26 ex 6 *Carollia perspicillata*. Some of these may represent errors of labeling either in the field or the laboratory. A few labels were difficult to decipher.

Trichobius longipes group

Species of this group are parasitic on phyllostomine bats of the genera *Tonatia* and *Phyllostomus*. There appears to be a distinct but very similar species on each species of *Tonatia*. Identification of species of this complex is extremely difficult without authentic comparative reference material.

Trichobius costalimai Guimarães

(Fig. 27A, 28B)

Trichobius costalimai Guimarães, 1937:660, Pl. 3, Fig. 10.—Wenzel, Tipton, and Kiewlicz, 1966: 471, Fig. 63E, 67B

VENEZUELAN SURVEY RECORDS (1,326 males, 759 females, 69 sex undet.)

This common, widely distributed species occurs on its characteristic host, *Phyllostomus discolor*, throughout its range.

To briefly summarize, the survey teams collected this fly at 34 localities in 13 states as follows: Barinas (1 locality, 611-620 m); Bolívar (2 localities, 150-306 m); Carabobo (2 localities, 60-598 m); Dto. Federal (2 localities, 380-1,507 m); Falcón (4 localities, 25-480 m); Guárico (2 localities, 181-630 m); Miranda (3 localities, 1-60 m); Monagas (2 localities, 18-1,165 m); Nueva Esparta (2 localities, 47-53 m); Sucre (2 localities, 1-380 m); T. F. Amazonas (4 localities, 126-195 m); Trujillo (2 localities, 60-164 m); Zulia (6 localities, 37-270 m).

OTHER VENEZUELAN MATERIAL EXAMINED
ARAGUA: 4 males and 4 females ex *Phyllostomus discolor*, Rancho Grande, 31-VIII-62, C. Machado and R. Antequera.

HOST ASSOCIATIONS
Of 2,154 specimens of *Trichobius costalimai* collected by the survey teams, 2,111 (96 percent) were from 285 *Phyllostomus discolor*, the characteristic host. The remaining 43 specimens were from 16 bats of 10 species, and probably most are contaminants or represent transfers. In nearly all instances these bats were collected at the same localities on the same dates as were specimens of *P. discolor*.

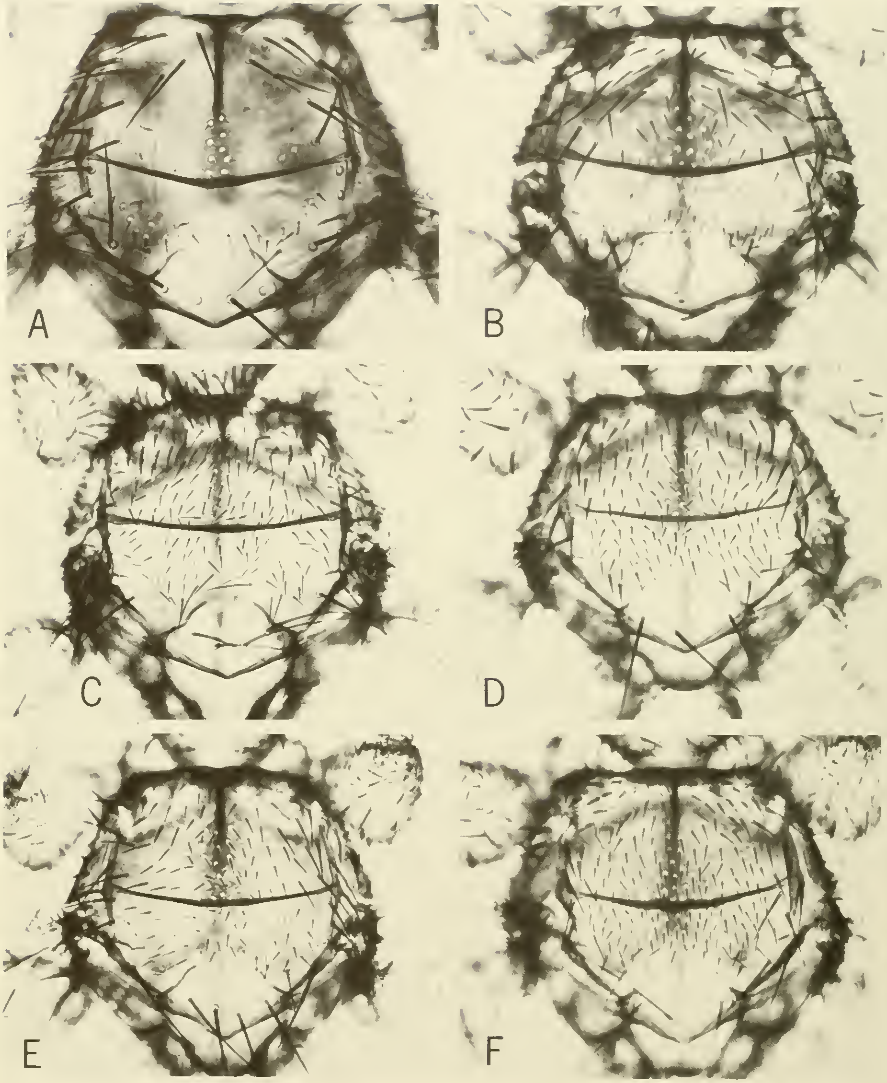

Fig. 27. Thorax, dorsal view, of species of the *Trichobius longipes* and *dunni* groups: A, *Trichobius costalimai* Guimarães, male; B, *Trichobius longipes* (Rudow), female; C, *Trichobius jubatus*, new species (female allotype); D, *Trichobius silvicolae*, new species (male holotype); E, *Trichobius strictisternus*, new species (male holotype); F, *Trichobius affinis*, new species (male holotype). A from Wenzel et al. (1966).

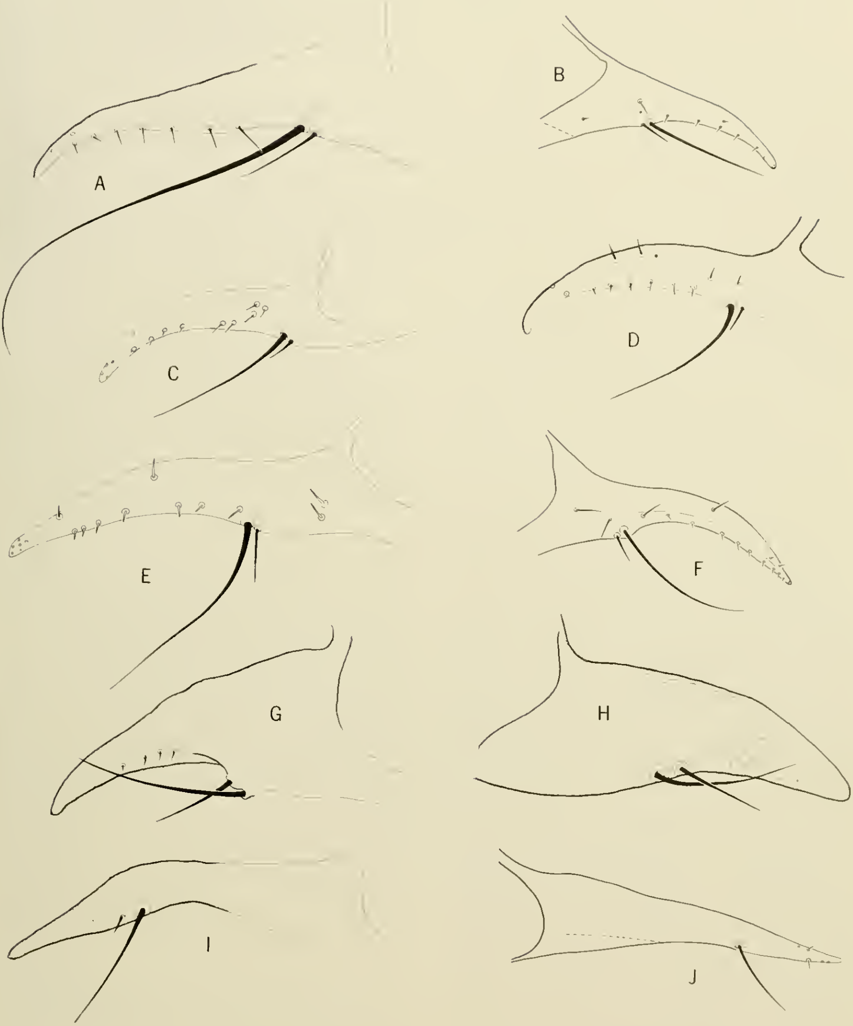

Fig. 28. Male postgonites of species of the *Trichobius dunni, longipes,* and *phyllostomae* groups: A, *Trichobius jubatus,* new species (holotype); B, *Trichobius costalimai* Guimarães; C, *Trichobius affinis,* new species (SVP 1790); D, *Trichobius silvicolae,* new species (holotype); E. *Trichobius strictisternus,* new species (holotype); F, *Trichobius longipes* (Rudow); G-H, *Trichobius hispidus,* new species (holotype); I, *Trichobius petersoni,* new species (SVP 4466); J. *Trichobius vampyropis* Wenzel. All drawn to same scale except B, C, F, from Wenzel et al. (1966).

Trichobius longipes Rudow
(Fig. 4A, 27B, 28F)

Trichobius longipes Rudow, 1871:121.—Wenzel, Tipton, and Kiewlicz, 1966:465

Trichobius mixtus Curran, 1935:10, Fig. 10.—Wenzel, Tipton, and Kiewlicz, 1966:465, Fig. 62A, E; 63F; 64.

Trichobius dugesii, authors (part), not Townsend.

Venezuelan Survey Records (372 males, 290 females, 1 sex undet.)

APURE: 1 female ex 1 *Molossus ater*, Pto. Páez, 76 m, 17-I-66; 50 males and 33 females ex *Phyllostomus hastatus*, 29 km SSW Santa Domingo, Selvas de San Camilo, Nulita, 24 m, 17-I—I-II-68.

BARINAS: 1 male and 3 females ex *Phyllostomus hastatus*, Altamira, 794 m, 21-XII-67.

BOLÍVAR: 1 female ex *Phyllostomus elongatus*, 25 km SE El Manteco, Los Patos, 150 m, 5-IV-66; 5 males and 13 females ex *Phyllostomus hastatus*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 8-20-VI-66; 1 male, same host, Icabarú, 473 m, 9-V-68; 2 males, same host, 28 km SE El Manteco, Los Patos, 150 m, 11-IV-66.

CARABOBO: 1 male ex *Phyllostomus hastatus*, 3 km SW Montalbán, Hda. La Canada, Montalbán, 618 m, 22-XI-67; 1 male, same host, 6 km N Urama, Urama, 60 m, 17-III-66.

FALCÓN: 3 males and 6 females ex *Phyllostomus hastatus*, 80 km NW Carora, Río Socopito 480 m, 20-V-68; 1 male and 1 female, same host, 19 km NW Urama, km 40, Urama, 25 m, 20-X-65.

GUÁRICO: 2 males and 2 females ex *Phyllostomus hastatus*, 1 male ex 1 *Desmodus rotundus*, 20 males and 14 females ex *Phyllostomus elongatus*, 14 km SE Calabozo, nr. Río Orituco, Est. Biol. de los Llanos, 100 m, 21-23-VIII-68; 8 males and 2 females, same host, 9 km SE Calabozo, Est. Biol. de los Llanos, 100 m, 20-VIII-68.

MIRANDA: 2 males ex *Phyllostomus hastatus*, Birongo, 60 m, 23-I-68; 8 males, 3 females, and 1 sex undet., same host, Cueva Alfredo Jahn, Birongo, 60-160 m, 20-I-68; 3 females, same host, 16 km SSE Caracas, San Andres, 950 m, 30-XII-65.

MONAGAS: 2 males and 1 female ex *Phyllostomus elongatus*, 16 males and 5 females ex *Phyllostomus hastatus*, 55 km SSE Maturín, Hato Mata de Bejuco, 18 m, 3-4-VI-68.

SUCRE: 20 males and 36 females ex *Phyllostomus hastatus*, 10 km NE Güiria, Ensenada Cauranta, 90 m, 7-VI-67; 20 males and 11 females, same host, 26 km ESE Carúpano, Manacal, 175-320 m, 21-31-VII-67.

T. F. AMAZONAS: 1 female ex *Uroderma bilobatum*, 2 males and 1 female ex 3 *Artibeus jamaicensis*, 1 female ex 1 *Rhynchonycteris naso*, 14 males and 16 females ex *Phyllostomus elongatus*, 108 males and 60 females ex *Phyllostomus hastatus*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 5-28-VII-67; 4 males and 2 females, same host, 2 males and 3 females ex *Phyllostomus elongatus*, 25 km S Pto. Ayacucho, Paria, Pto. Ayacucho, 114 m, 13-IX—4-X-67; 1 male and 2 females, same host, 1 male and 1 female ex *Phyllostomus hastatus*, Río Orinoco, Tamatama, 135 m, 27-IV—7-V-67; 4 males and 7 females, same host, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 29-V—1-VI-67; 1 male and 2 females, same host, 30 km S Pto. Ayacucho, Coromoto, Pto. Ayacucho. 126 m, 11-IX-67; 3 males and 1 female, same host, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 6-7-IX-67; 1 male and 1 female, same host, 33 km S Pto. Ayacucho, El Raudal, Pto. Ayacucho, 195 m, 20-IX-67; 2 males and 2 females ex *Phyllostomus elongatus*, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 20-II-66—24-III-67; 6 males and 8 females, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 5-14-IV-67.

TRUJILLO: 1 male ex *Phyllostomus hastatus*, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 5-IX-65; 5 males and 3 females, same host, 23 km N Valera, nr. Agua Viva, Valera, 164 m, 16-IX-65; 1 female, same host, 23 km NNW Valera, Río Motatan, Valera, 90 m, 2-IX-65; 7 males and 1 female, same host, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 18-22-X-65.

YARACUY: 1 female ex *Uroderma bilobatum*, 10 km NW Urama, El Central, Urama, 25 m, 14-III-66; 16 males and 13 females ex *Phyllostomus hastatus*, 11 km NW Urama, El Central, Urama, 25 m, 14-III-66; 4 males and 1 female, same host, 13 km NW Urama, El Central, Urama, 25 m, 20-III-66.

ZULIA: 24 males and 22 females ex *Phyllostomus hastatus*, 39 km WNW Encontrados, El Rosario, 37 m, 31-III—1-IV-68; 2 males and 5 females, same host, 33 km NW La Paz, nr. Cerro Azul, 75 m, 13-VI-68.

Other Venezuelan Material Examined

ARAGUA: 2 males and 2 females ex *Phyllostomus hastatus*, Alfredo Jahn Cave, 7-V-61, J. Racenis, J. Ojasti, and C. Bordon.

Host Associations

Of 663 specimens of *Trichobius longipes* collected by the survey teams, 551 (83 percent) were from 180 *Phyllostomus hastatus* and 104 (15.7 percent) from 34 *P. elongatus*. The other records clearly represent contaminants, temporary transfers, or errors of labeling. The records from *P. elongatus* are interesting, because this bat does not appear to be parasitized by any "characteristic" species of streblid, but rather by a number of species whose primary associations are with other hosts.

REMARKS

I am not certain that all of the above specimens represent a single species. There appear to be slight differences between the populations whose geographic distributions parallel those of *Phyllostomus hastatus hastatus* and *P. h. panamensis*. Should these flies prove to be specifically distinct, then the name *T. mixtus* Curran would have to be revived for the species from *P. h. hastatus*.

Trichobius silvicolae, new species

(Fig. 27D, 28D)

Virtually identical to *Trichobius dybasi* Wenzel but with very different male postgonites. Those of *dybasi* are rather thick at base and very strongly curved, the apices at right angles to the base. Those of *silvicolae* (Fig. 28D) are distinctly more slender and more evenly tapered and curved.

DESCRIPTION

Similar to *Trichobius dybasi* Wenzel (1966: 469) and the description of that species applies in all particulars excepting the male postgonites. In *silvicolae* these are rather evenly tapered and curved, each with ± 5 distinct, very short setae along ventral margin, 2 more inserted above the macroseta, another near dorsal margin at about midlength, and 4-5 distal sensillae; accessory seta relatively short, inserted next to and anterior to macroseta, which extends nearly to apex of postgonite.

MEASUREMENTS

	Males	Females
BL	1.42-1.64	1.57-1.86
TL	0.54-0.59	0.58-0.67
WL	1.16-1.21	1.32-1.38
WW	0.60-0.67	0.64-0.74

TYPE DATA

Male holotype and female allotype ex *Tonatia silvicola* (SVP 19359), Venezuela, T. F. Amazonas, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 30-V-67. PARATYPES—BOLÍVAR: 1 female ex 1 *Phyllostomus hastatus*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 15-VI-66. T. F. AMAZONAS: 6 males and 3 females ex *Tonatia silvicola*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 3-I-67; 5 males, 4 females, and 1 sex undet., same host and same data as holotype but 12-VI-67; 1 male and 1 female, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 5-12-IV-67.

REMARKS

The single specimen from *Phyllostomus hastatus* is probably a "stray." *Trichobius silvicolae* and *T. dybasi* appear to be allopatric on the same host species. In addition to the type series of *dybasi* from Panama, I have seen 3 males and 3 females of *dybasi* from Peru (Piura, Salitral) on the Pacific slope of the Andes. These are also from *Tonatia silvicola*.

Trichobius affinis, new species

(Fig. 27F, 28C)

Almost identical to *Trichobius mendezi* (ex *Tonatia minuta*) in chaetotaxy, the shape of the oral cavity, and female abdominal structures. Apparently differing from that species only in the shape of the theca—which is distinctly longer than broad, with strongly converging sides in *mendezi*—and in the shape of the male postgonites.

DESCRIPTION

With the characters of *Trichobius mendezi* Wenzel (loc. cit., p. 469), and the description of that species applies equally well to *affinis* n. sp. except that: in *affinis* the theca is distinctly longer than broad, but sides not strongly convergent to apex; apices of male postgonites slender but not as narrowed as in *mendezi*. As in *mendezi*, the microtrichia of the prescutum are limited to the margin of the notopleural suture and do not extend inwardly past the marginal macrosetae.

MEASUREMENTS

	Males	Females
BL	1.53-1.79	1.69-1.70
TL	0.58-0.59	0.60-0.64
WL	1.19-1.26	1.35-1.39
WW	0.62-0.66	0.69-0.72

TYPE DATA: Male holotype ex *Tonatia brasiliensis* (SVP 29348) and female allotype, same host (SVP 29551), Venezuela, T. F. Amazonas, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 27-VII-67. PARATYPES—APURE: 1 male and 1 female ex *Tonatia brasiliensis*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 23-I-68. FALCÓN: 2 males and 1 female ex *Tonatia brasiliensis*, 19 km NW Urama, Km 40, Urama, 24-25 m, 20-27-X-65. T. F. AMAZONAS: 1 male, same data as the holotype.

Trichobius strictisternus, new species
(Fig. 27E, 28E)

Distinct from all other species of the group in its narrowly rounded anterior mesosternal margin—which resembles that of species of the *caecus* group—and in the more densely setose sternum 7+8 (9 setae as opposed to 5 or 6 in most species of group). The chaetotaxy of the abdomen, including sterna 2 and 5, resembles that of *silvicolae*, but the setae are slightly denser and, on apical margin of sternum 5, are distinctly longer. The male postgonites resemble those of *silvicolae*.

Description

Head. Eyes with 11 large facets, their length distinctly less than greatest width of a laterovertex. Each occipital lobe with about 7 conspicuous long setae, 1 or 2 shorter strong ones along posterior margins, and 1 minute seta ventral to these. Palpi oval, slightly longer than broad, feebly pointed at apex; underside bare on about apical fourth. Theca nearly triangular. Sides of oral cavity moderately convergent to base. Mesonotal chaetotaxy as in Fig. 27E. Microtrichia present only along edges of notopleural sutures. *Wings* and *Legs*. Without distinctive characters.

Abdomen. Male. Dorsolateral connexival setae slightly shorter along inner edge of setose area, the rest of the setae longer and somewhat coarse, appearance hirsute; ventral connexival setae conspicuously shorter. Sternum 2 basally with fairly short setae that are only slightly longer than the connexival setae, becoming only slightly longer apically; setae along posterior margin distinctly longer, becoming longer laterally, the longest ones nearly twice the length of the anterior discal setae. Sternum 5 basally with setae of about same size as the connexival setae adjacent to them, but becoming about twice as long apically, some of those on apical margin, toward sides, 2-½ to 3 times as long as the shorter discal setae. Sternum 7+8 with ± 9 setae on each side, including 2 or 3 short setae near dorsomedial margin, the others strong setae, some of them long macrosetae. Tergum 9 with 11-12 setae, 4-5 of them macrosetae, 5-6 of the most ventral ones short. Postgonites as in Fig. 28E. Female. Unknown.

Measurements

	Male holotype
BL	1.90
TL	0.67
WL	1.47
WW	0.75

Type Data: Male holotype ex *Tonatia carrikeri* (SVP 28813), Venezuela, T. F. Amazonas, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 24-VII-67.

Trichobius dunni group

Trichobius dunni Wenzel was treated as a member of the *Trichobius longipes* group by Wenzel et al. (1966, p. 474). With the discovery of additional species that are related to *dunni*, it is clear that *dunni*, *T. cognatus* Peterson and Hurka, *T. jubatus* n. sp., and *T. imitator* n. sp. form a distinctive species group.

Species of this group appear to be characteristic parasites of bats of the family Molossidae. A possible exception is *T. imitator* n. sp. (q.v.), which is recorded as having been taken from *Anoura* sp. A. Together with other undescribed ones, these form a distinctive assemblage of species that possess most characters of the *longipes* group, especially the fusion of the metasternal lobe and metepimeron; but they differ in being generally much more densely setose and also as follows:

Occipital lobes densely setose, each with 15-21 or more strong setae, as opposed to 7 or 8 in species of the *longipes* group. Each laterovertex with 14-15 or more setae (several of them macrosetae), including a group of 8-9 short thornlike setae along anterior margin, in contrast to 5 or 6 setae, 3 of them macrosetae, in the *longipes* group. Setae along inner or inner ventral margin of protibiae conspicuously longer than the others, as are 1-2 ventrolateral rows of stronger setae on meso- and metatibiae, all of these longer setae becoming short and merging with other setae distally. Male aedeagus narrowly half-spear shaped in profile, rather than ribbonlike as it is in the *longipes* group.

Trichobius imitator, new species

Distinct from all other species of *Trichobius* in the following combination of characters: the densely setose occipital lobes of the head, the large multifaceted eyes (25-27 facets), the distinctive mesonotal chaetotaxy, the metasternal lobe united with metipimeron, the large female tergum 7 with numerous setae, and the subconical-flangelike ventral arc. Superficially resembling *T. dunni* Wenzel, *T. cognatus* Peterson and Hurka, and *T. jubatus* n. sp., but differing from all of these in its large multifaceted eyes and the large setose tergum 7.

Description

Head. Approximately as long as broad. Eyes very large and conspicuous, with 25-27 conspicuous facets, much longer than greatest width of each laterovertex and longer than greatest length of each occipital lobe. Each laterovertex rather narrow, elongate, with 6 long, strong setae (4 of them macrosetae) and, along anterior margin, a dense series of 8-9 shorter thornlike setae; each occipital lobe with 17-18 very strong setae, most of them macrosetae, the most anterior one conspicuously longer than the rest, those along posterior edge shorter than the others. Palpi elongate, oval, distinctly longer than broad, apical margins rounded, the ventral surface very densely studded with short, thornlike setae as are the lateral margins, the distal macrosetae about as long or slightly longer than the palpi. Theca slightly longer than broad, nearly triangular.

Thorax. Relatively long, anterior margin slightly rounded, median suture present on about anterior half, transverse suture distinctly angulate. Prescutum with 85-90 setae including a cluster of 8-9 strong setae in each anterior angle, 7 or 8 macrosetae along each side, and medial to these a series of somewhat shorter setae which merge into a median discal area of about 26-27 denser, relatively short setae; a conspicuous bare area on each side of median suture and a little more than middle half of anterior margin. Scutum with ± 43-45 short setae similar to those in the median area of prescutum, a row of much longer antescutellar setae, several of them macrosetae, and 5 macrosetae along each lateral margin; microtrichia restricted to margin of notopleural suture. Scutellar setae about as long as scutellum is wide. Lateral angles of mesosternal projection rounded, apical margin not very wide, subarcuate, sides strongly oblique. Metasternum somewhat longer than in most species; apical lobe well developed, ascending dorsally to unite with the metepimeron.

Wings. Without distinctive characters except that *R* has a macroseta and a couple of strong shorter setae; base of fifth vein with 2 strong macrosetae, base of third bare without either macrosetae or short setae; third crossvein much closer to the first than to the second.

Legs. All tibiae clothed with very short but strong, conspicuous setae. Inner face of profemora with numerous short, strong setae that become a little longer distally and dorsally; outer face with much more slender, short setae which become long distally and dorsally; upper surface with about 6 macrosetae just before midlength, these becoming somewhat shorter but still very strong distally. Midfemora with strong setae on lateral face, these very short basally, longer distally; a few scattered macrosetae on apical half of dorsal surface. Outer face of hindfemora with short, fine setae basally, and longer ones distally; upper face densely clothed with long setae, including a number of macrosetae.

Abdomen. Lateral lobes of tergum 1+2 with ± 18 strong setae, the more dorsal ones mostly macrosetae, and 7 or 8 shorter, finer setae ventrally. Sternum 2 with rather uniform and rather dense setae, those along posterior margin somewhat longer, becoming much denser and longer toward sides. FEMALE. Dorsal connexivum with a row of setae across apex in front of tergum 7, a couple of these very strong and rather long; lateral connexival setae short but strong, dense; setae of venter a little shorter than those on lateral margins. Tergum 7 (difficult to see in the unique type), very large, broader than the supra-anal plate, and apparently subtriangular, the apex anterior, rounded, basal margin apparently arcuate; each side with a cluster of 5 very strong setae, several of these are rather short, one is of intermediate length, and the fifth and most posterior and mesal one is a macroseta; 3 microsetae situated between the macrosetae. Supra-anal plate with 2 very slender discal setae that are a little shorter than the plate is wide, and anterior to them about 13-14 other short setae, consisting of 2 widely separated pairs along anterior margin, 6 in a row across middle and 3 or 4 along apical margin. Seventh sternites very large, suborbicular, each much wider than supra-anal plate; with about 21 shorter setae on anterior half, these becoming longer laterally, and 15-16 macrosetae, some of them very long and dense. Ventral arc, viewed from beneath, appearing as a hollow subtruncate cone, its dorsal articulation, viewed from above, appearing as a distinct, wide, rather long flange.

MEASUREMENTS

	Female
BL	2.16
TL	0.82
WL	1.78
WW	0.87

TYPE DATA: Female holotype ex *Anoura* "sp. A" (SVP 12983), Venezuela, Bolivar, 47 km ESE Caicara, Hato La Florida, 50 m, 5-V-67.

HOST ASSOCIATIONS

Since the other species of this complex are characteristic parasites of Molossidae, and since only 1 specimen of *Trichobius imitator* was collected, I doubt that the host of the type is the characteristic host of this species. It is more apt to be a parasite of *Molossus aztecus*, which was collected at the same time.

Remarks

The only other known species of *Trichobius* which have such large multifaceted eyes are members of the *phyllostomae* group.

Trichobius jubatus, new species

(Fig. 27C, 28A)

Very similar to *Trichobius dunni* Wenzel (1966:474) and *T. cognatus* Peterson and Hurka (1974:1056). Differing from both in its very densely setose mesonotum, the total number of prescutal and scutal setae of all types being 185-200 in *jubatus* n. sp., ± 116 in *dunni*, and ± 150 (male holotype) in *cognatus*. The female of *dunni* is unknown. The setation of sterna 7±8 and tergum 9 is nearly identical in *jubatus* and *cognatus*, but in *dunni* these and the lateral lobes of tergum 1+2 appear to have fewer setae. The postgonites are nearly identical to those of *dunni* and *cognatus* but more slender. The seventh sternites of female *jubatus* have 14-16 very strong macrosetae along apex, 9-10 shorter ones anterior to these, and, preceding these, ± 52 short setae of varying lengths, for a total of 75 or more setae ("about 50" in *cognatus*).

Description

Head. Similar to that of *T. imitator*. Eyes with only 10-11 large facets, slightly longer, viewed from above, than greatest width of a laterovertex and distinctly longer than greatest length of occipital lobes. Palpi only slightly longer than broad, not quite as densely setose as in *imitator* n. sp. Each laterovertex with a series of 8-9 short thornlike setae along anterior margin; behind this group are 3 very strong and rather long setae, one a conspicuously long macroseta, another somewhat shorter, the third only about half as long as the macroseta; another macroseta situated above eye; 2-3 other setae situated at inner posterior angle, one of these very strong and rather long, the others successively shorter. Each occipital lobe with about 15 very strong setae, some of them macrosetae, and 4-5 short ones, several of these along posterior margin. Theca subtriangular, slightly wider than long. Mesonotum long, anterior margin rounded, slightly emarginate at middle; median suture rather long, extending to middle or a little beyond; transverse suture rather evenly bowed, sharply defined throughout its width; mesonotum rather convex, densely setose, with 185-200 setae; most setae in a rather broad median area of prescutum very short, as are those on scutum; prescutal setae gradually becoming longer anteriorly, especially 5-7 very strong ones in anterior angles and 8-10 very long ones along lateral margins, where they are conspicuously longer than the other setae; scutum with 5 macrosetae along lateral margins; antescutellar row variable, at times composed of only very short setae like those of the disc but with a longer conspicuous seta at each end, sometimes entirely or almost entirely composed of rather long setae that are about half as long as the macrosetae in posterolateral angles; microtrichia present along margins of the notopleural sutures. Scutellar setae long, slightly longer than scutellum. Anterior projection of mesosternum with strongly oblique sides, the anterior margin rather narrow, subarcuate. Metasternal lobe united with the metepimeron.

Wings. Third vein bare basally in some specimens, in others with a few small and 1 strong setae.

Legs. Very similar to those of *imitator* but not quite as densely setose. Protibiae with conspicuously longer and distinctly stronger setae along inner ventral margin, theca becoming short and merging with the other setae distally; meso- and metatibiae basally with a row of much longer and distinctly stronger setae along outer ventral margin, these becoming shorter, indistinguishable from the others a little beyond midlength.

Abdomen. Lateral lobes of tergum 1+2 with ± 25 setae, the dorsal ones much stronger, several of them conspicuous macrosetae, the ventral ones much shorter. Sternum 2 rather evenly covered with short setae, these distinctly longer than ventral connexival setae, those of apical margin and lateral angles noticeably longer. Female. Lateral connexival setae rather short, distinctly longer near apex, a cluster of somewhat longer, stronger setae present behind lateral lobes of tergum 1+2, this cluster extending ventrally; ventral connexival setae scarcely longer than the laterals, becoming minute apically. Tergum 7 not sclerotized but represented by 2 minute setae. Surpa-anal plate a little broader than long, with 13-14 minute setae along base, near apex, and in between. Seventh sternites very large, oval, densely covered with setae, these moderately short but very strong on most of disc, longer along inner apical margin, 14-16 of them macrosetae of varying lengths on outer distal portion. Ventral arc strongly arched, the sides appearing flanged in slide preparations. Male. Connexival setae very similar to those of female, including a cluster of stronger setae behind lateral lobes of tergum 1+2. Sternum 5 well sclerotized, apical margin slightly emarginate at middle; basal discal setae similar to those of the ventral connexivum, but becoming somewhat longer apically and laterally, distinctly longer along apical margin and in posterolateral angles. Sternum 6 present. Each side of sternum 7+8 with 32-43 strong setae of varying lengths, including 1 macroseta near dorsal surface, these becoming shorter ventrally. Tergum 9 with 9-33 setae on each side, about 6 of these very long, strong macrosetae, 7-8 others along posterior margin strong but not as long as the preceding macrosetae, 4-5 along ventral margin long and slender (1 a very slender macroseta), the remaining setae rather short. Postgonites as in Fig. 28A.

MEASUREMENTS

	Males	Females
BL	1.80-2.10	1.94-2.30
TL	0.68-0.76	0.76-0.80
WL	1.64-1.73	1.76-1.86
WW	0.77-0.88	0.79-0.92

TYPE DATA

Male holotype ex *Molossus ater* (SVP 5735) and female allotype, same host (SVP 5738), Venezuela, Apure, 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 17-XII-65. PARATYPES—APURE: 1 female ex *Molossus ater*, 46 km NE Pto. Páez, Hato Cariben, 76 m, 17-XII-65; 3 males and 2 females, same host, same data as the holotype but 13-17-XII-65. MONAGAS: 10 males and 4 females ex *Molossus ater*, 5 km NW Caripe, San Agustín, 1,160 m, 28-VI–8-VII-67. T. F. AMAZONAS: 2 males ex *Molossus ater*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 7-I-67; 1 male and 1 female, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 18-24-VII-67, 1 male ex *Molossus aztecus*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 25-VII-67.

REMARKS

Through the kindness of Dr. B. V. Peterson, I have been able to examine the male holotype of *Trichobius cognatus*. Because it is preserved in glycerin, I could not make careful comparison of the postgonites with those of *jubatus*, which are mounted in balsam.

Trichobius phyllostomae group

The species of this group appear to be restricted to bats of the genera *Sturnira* and *Vampyrops*. Three species were represented in the Venezuelan collections, namely *Trichobius vampyropis* (from 2 species of *Vampyrops*), *T. petersoni* n. sp. (from *Sturnira erythromos* and *S. bogotensis*), and *T. hispidus* n. sp. (from *Sturnira erythromos*). Interestingly, none were taken from *Sturnira lilium* or *S. ludovici*. This is puzzling, because members of the *phyllostomae* group occur on *S. lilium* in southern Brazil and on *S. ludovici* in Panama. Their absence on these bats in Venezuela can hardly be an artifact of collecting, since about 2,000 Streblidae, of several species in 2 genera, were taken from the more than 2,000 specimens of *Sturnira l. lilium* and 363 *S. ludovici* that were collected in Venezuela.

The two new species, *T. petersoni* and *T. hispidus*, have greatly elongated hindlegs, which, together with a great similarity in dorsal appearance of the head and the form of the mesosternum, appear to represent remarkable instances of convergence in form and structure with species of *Speiseria* (q.v.). However, they are easily distinguished from species of that genus by the absence of scattered macrosetae on the meso- and metatibiae, the absence of macrosetae along the angle of the sixth longitudinal wing vein, and other less obvious characters.

Trichobius vampyropis Wenzel

(Fig. 28J, 29C)

Trichobius vampyropis Wenzel, 1966:500, Fig. 74B, 75C

VENEZUELAN SURVEY RECORDS (16 males, 14 females)

BARINAS: 1 female ex *Vampyrops vittatus*, 2 km SW Altamira, Altamira, 619 m, 5-I-69.

DTO. FEDERAL: 5 males and 1 female ex *Vampyrops vittatus*, 6 males and 8 females ex *Vampyrops umbratus*, 4 km NNW Caracas, Los Venados, 1,400-1,524 m, 22-VII–3-VIII-65; 2 males and 1 female, same host, 5 km NNE Caracas, nr. Hotel Humboldt, Pico Ávila, 2,092 m, 20-29-VIII-65.

MIRANDA: 2 males and 3 females ex *Vampyrops umbratus*, 5 km NNW Guarenas, Curupao, 1,160 m, 5-12-X-66; 1 male, same host, 5 km NNE Caracas, nr. Hotel Humboldt, Pico Ávila, 2,110 m, 23-VIII-65.

OTHER VENEZUELAN MATERIAL EXAMINED

DTO. FEDERAL: 2 males and 2 females ex *Vampyrops* sp., Silla de Caracas, 2,200 m, 21-X-62, J. Ojasti.

HOST ASSOCIATIONS

Of 30 specimens of *Trichobius vampyropis* collected by the survey teams, 23 (76.6 percent) were from *Vampyrops umbratus*, the rest from

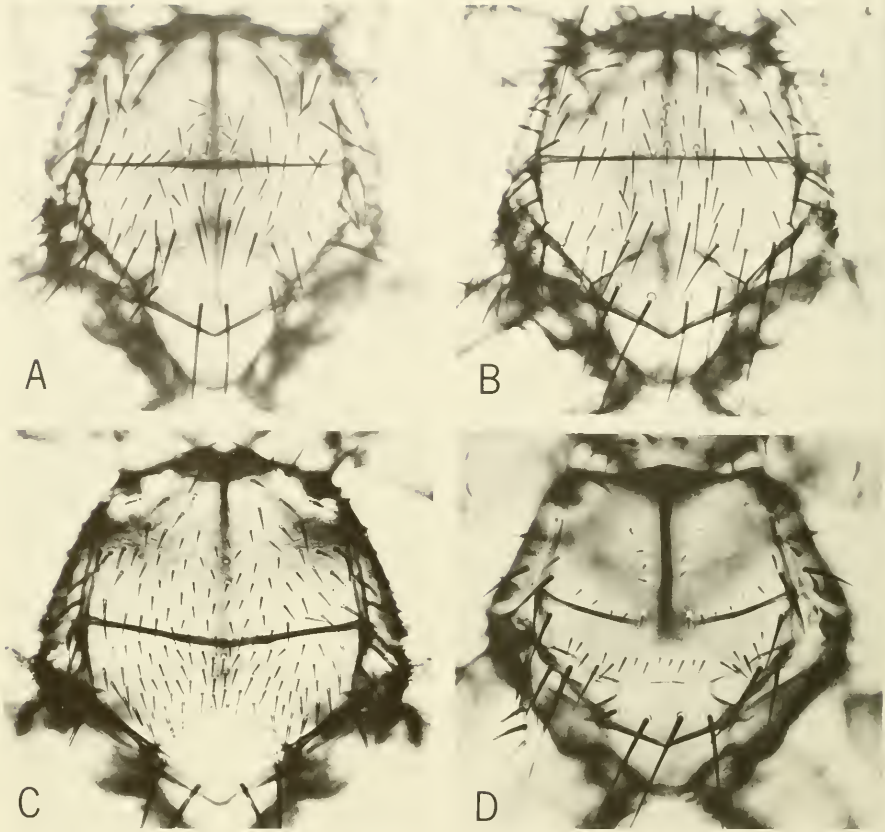

Fig. 29. Thorax, dorsal view, of species (A-C) of the *Trichobius phyllostomae* group and (D) the Genus *Trichobioidess* A, *Trichobius petersoni*, new species (female allotype); B, *Trichobius hispidus*, new species (female allotype); C, *Trichobius vampyropis* Wenzel (female allotype); D, *Trichobioides perspicillatus* (Pessôa and Galvão), male. C-D from Wenzel et al. (1966).

Vampyrops vittatus, the host from which the type was collected in Panama.

Trichobius petersoni, new species

(Fig. 281, 29A)

Trichobius petersoni n. sp., and the following new species, *T. hispidus* differ from all other species of the *phyllostomae* group in having greatly elongated hindlegs and short forelegs, thus resembling species of *Speiseria* and *Paratrichobius*. Differences between the two species are summarized under *T. hispidus*.

DESCRIPTION

In general, closely resembling species of *Speiseria*. *Head*. Subquadrate, dorsal aspect very similar to that species of *Speiseria* and *Paratrichobius*. Eyes large, conspicuous, with 25-57 facets, their length equal to or slightly greater than maximum width of a laterovertex, each of the latter with 6 coarse strong setae (one of them a long macrosetae) and 1 short stout setae along anterior margin. Each occipital lobe with about 5 shorter stout setae along outer and posterior margin and 6 other long setae, 2 of them unusually long macrosetae that are nearly as long as head is wide; longer setae inserted on distinct tubercles; inner portion of each lobe rather narrow. Palpi feebly transverse, subovate, their inner anterior margin oblique; undersurface setose but the outer apical fourth bare except for a strong ventrally directed seta near margin. Theca transverse, sides arcuate and subparallel on basal half, then converging to apex; distinctly broader than long, with numerous setae on a little more than apical half and a couple of pairs along basal margin. Oral cavity broad, posterior margin rounded; numerous scattered, erect and semierect setae, mostly short but of varying lengths, behind oral cavity.

Thorax. Anterior margin rather strongly projecting and bilobed, somewhat emarginate on each side for reception of the occipital lobes of the head; median suture present on about apical half; transverse suture straight, a little wider and less distinct along midthird or slightly more. Prescutum with strong setae along anterior margin, these becoming longer at anterior angles and posteriorly and along sides, those in front of transverse suture becoming gradually finer and shorter medially, and only slightly longer than a short median discal seta; setae lacking on each side of median suture. Discal scutal setae slightly shorter than the prescutal setae immediately in front of transverse suture, becoming slightly longer posteriorly, some of them conspicuously longer immediately in front of the antescutellar row; the 8-10 setae of this row quite long, the median ones extending to about midlength of scutellum; 5 macrosetae along lateral margin, 1 of them nearly as long as scutellum is wide; outer pair of scutellar setae only about half as long as the median pair. Mesosternum strongly projecting between the front coxae, anterior margin subtruncate, very deeply emarginate. Metasternal lobe long, rather slender, pointed, reflexed dorsally, and extending half or more of the distance to metepimeron.

Wings. Without distinctive characters. *Legs.* Prolegs short, femora stout; outer face of profemora with numerous fine, rather short setae, these becoming longer along outer dorsal edge, which has a row of 7-8 conspicuously longer setae; dorsal surface with 2 rows of long coarser setae, an outer one of 4, the apical one much more slender, and an inner diagonal row of about 4; inner face with very minute setae except distally near lower margin where there are numerous, longer, though short setae and 1 very strong curved apical seta. Midlegs longer and more elongate than forelegs; midfemora with fine, short, recumbent setae on inner face, those along inner ventral margin distinctly longer and stronger; outer face with many short and long setae, many of them macrosetae, the longest ones being along inner dorsal margin on about apical half; outer ventral margin with numerous long setae. Hindlegs greatly elongated, nearly twice as long as forelegs; hindfemora clothed with very short recumbent setae on inner face; with longer, though short setae on outer face; 4 or 5 long setae, some of them macrosetae, along inner dorsal margin on basal half and about 4 much longer setae; 4 long setae on about apical ⅔ of outer edge of upper margin, 3 of these very conspicuous macrosetae, that are as long as or longer than maximum width of femur; underside of femur at base with a cluster of long setae, followed by a row of long setae along lower outer margin. Last segment of tarsus about twice as broad as preceding tarsomeres.

Abdomen. Each lateral lobe of tergum 1+2 with ±6 rather short, very slender setae along inner margin on each side; apical and lateroventral margins with a strong cluster of ±18 setae, about 6 or 7 of these much shorter though stout, the other macrosetae including a couple of conspicuously longer ones. Sternum 2 relatively narrow with typical triangular setose area, most of the setae rather heavy and fairly short, a few of them finer, those along posterior margin at middle, more slender, two of them especially so, becoming heavier toward lateral angle. FEMALE. Lateral connexival setae short, but including a cluster of 4 or 5 stronger setae on each side behind lateral lobes of tergum 1+2, these from 1 to 3 times as long as the other setae; ventral connexival setae similar to the lateral ones, though slightly longer, especially a transverse group of conspicuously longer setae near apex. Tergum 7 very short and broad, rather arcuate, a long macroseta near each outer edge —these longer than the macrosetae of supra-anal plate—and a pair of very short fine setae medial to these. Supra-anal plate, in addition to the 4 apical macrosetae, with 2 short setae along each lateral margin and 2 widely spaced ones anterior to the 2 medial macrosetae. Seventh sternites small, oval, transverse, with ±6 setae distally, these about as long as apical connexival setae, followed by about 3 longer setae on inner half, 4 or 5 conspicuously longer setae along distal margin, and 1 extremely long, very heavy macroseta. MALE. Fifth sternum well developed, broad, apical margin feebly emarginate; disc clothed with setae similar to those of the connexivum anterior to them; apical margin, on about middle third, with 5-6 long slender setae, these about twice as long as the longer discal setae, and, on each side, a row of 3-4 very long macrosetae of which 2 are usually conspicuously longer than the others. Sternum 7+8 with 2 short setae and 1 very long macroseta. Tergum 9 with ± 12 setae, of which the most ventral 4-5 are rather short, most of the others being long, conspicuous macrosetae; in some specimens the most dorsomedial setae of tergum 9, while they may be very long, are conspicuously shorter than the other macrosetae. Male postgonites distinctly bent a little beyond middle, the left one broader than the right one, dorsal margin of both distinctly sinuate before apex; ventral macroseta of right postgonite inserted just beyond the bend, the accessory seta inserted just distal to it, this inserted more distad on the left postgonite, which has several denticlelike setae distal to the accessory seta, these lacking on the right postgonite; both postgonites with a couple of widely spaced sensillae on dorsal margin, one along the dorsal bend, the other along the sinuation, and, also, a subapical dorsal sensilla and several minute distal sensillae; aedeagus very slender and pointed distally, widened and troughlike basally.

MEASUREMENTS

	Males	Females
BL	1.75-2.13	1.62-2.30
TL	0.67-0.76	0.71-0.83
WL	2.04-2.28	2.05-2.49
WW	0.82-0.96	0.67-1.01

TYPE DATA

Male holotype, female allotype, and 1 male and 1 female paratype ex *Sturnira bogotensis* (CJM 13139), Colombia, Cundinamarca, Bogota, X-68, C. J. Marinkelle. All in the collection of Field Museum of Natural History. PARATYPES—VENEZUELA. MÉRIDA: 1 male ex *Sturnira bogotensis*, 4 km E Tabay, La Mucuy, Tabay, 2,107 m, 8-III-66; 8 males and 4 females ex *Sturnira erythromos*, 12 km SE La Azulita, La Carbonera, 2,150-2,180 m, 21-23-IV-66; 1 male and 2 females, same host, 6 km SE La Azulita, La Carbonera, 1,870 m, 23-IV-66. MONAGAS: 2 females ex *Sturnira erythromos*, 3 km NW Caripe, nr. San Agustín, 1,345 m, 11-VII-67. Zulia: 1 male ex *Sturnira erythromos*, 19 km WSW Machinques, Novito, 1,135 m, 2-V-68.

Trichobius hispidus, new species

(Fig. 28G, H; 29B)

Closely resembling *Trichobius petersoni* n. sp., but differing markedly from that species as well as others of the group by its conspicuous long setae on the dorsal connexivum on each side of the bare median area, as well as in having more numerous eye facets (± 36 as opposed to 25-27), more numerous setae on the occipital lobes, a longer theca, entirely different male postgonites, and other differences cited in the key.

Like *T. petersoni*, *hispidus* differs from all other species of the group in having greatly elongated hindlegs and short forelegs, these conspicuously shorter than midlegs. Both these species and *T. vampyropis* differ further from *brennani* and *phyllostomae* in having a more elongate thorax and more strongly projecting anterior prescutal margin.

DESCRIPTION

Head. Similar to that of *petersoni* but a little narrower, not as flattened, and with lateral portion of occipital lobes not as strongly projecting posteriorly. Eyes larger, with ±36 facets; longer, viewed from above, than greatest width of a laterovertex. Each laterovertex with 6 strong macrosetae, and a minute seta along anterior margin. Occipital lobes each with about 9 setae and 1 or 2 minute setae below posterior margin. Palpi elongate-oval, ventral surface bare on ±apical third.

Thorax. More elongate, less quadrate than in *petersoni*, anterior margin of mesonotum usually rather strongly arcuately projecting at middle, distinctly but not strongly emarginate on each side of the projection. Chaetotaxy of mesonotum very similar to that of *petersoni*, but most setae slenderer, and the shorter medial setae of prescutum and scutum, especially, are distinctly longer than in that species.

Wings. Without distinctive characters. *Legs*. Very similar in size and chaetotaxy to those of *petersoni*, but mid- and hindfemora with longer and more numerous long setae.

Abdomen. Lateral lobes of tergum 1+2 each with 16-18 setae, most of them conspicuous long macrosetae, especially along posterior margin; inner margin of lobes with ±5 shorter, very thin setae. Sternum 2 with strong setae, most of those on apical margin at least a third longer than the discal setae, ±4 of them conspicuously longer macrosetae. Lateral setose area of dorsal connexivum with conspicuous slender macrosetae, generally arranged in transverse rows, or clusters, of 2-5 each, including a group behind lateral lobes of tergum 1+2., usually a group per segment on each side, with shorter setae intermingled, these generally distinctly longer than those along lateral margins; the long setae less numerous in the males. Ventral connexivum in both sexes with setae of about the same length as the discal setae of sternum 2 but more slender, and with the usual segmentally disposed (2 pairs per segment) longer, slender setae. Female. Tergum 7 transverse, striplike, i.e., short and wide, not united with supra-anal plate, with a pair of long macrosetae (these as long or longer than the 4 distal macrosetae of supra-anal plate), one on each side, and medial to each of these a slender seta that is about one-third as long. Seventh sternites small, at least as long as broad, their posterior margin rounded, sides converging apically to a blunt point; with 15-17 setae, including 7-8 short anterior ones, 1 conspicuously longer distal macroseta, and 1 shorter macroseta, the others of intermediate lengths. Male. Sternum 5 shorter than in *petersoni;* discal setae similar to ventral connexival setae; apical and lateral margins with conspicuously longer setae, 8-10 of them very long macrosetae of which 1-2 pairs on each side may be unusually long. Sternum 6 absent. Sternum 7+8 with 1-2 macrosetae (1 conspicuously longer) and 1-2 shorter setae. Tergum 9 on each side with about 10 slender macrosetae and 8-9 shorter setae, about 5 of these situated anteroventrally. Postgonites short, asymmetrical; basally very broad (in lateral profile; the macrosetae and accessory setae inserted on a projection, at approximately the same location on both gonites; accessory seta long and strong, about half length of macroseta, or slightly longer; right postgonite suddenly narrowed and relatively slender, its dorsal margin nearly straight from this point, the ventral margin curved, with 4 or 5 short setae at the orifices of long, oblique, internal trabeculae, other trabeculae (without visible setae) situated distal to these and at apex; left postgonite broad, bladelike (in lateral view), strongly curved dorsally beyond level of insertion of ventral setae, ventrally with a submarginal row of 4 or 5 sensillae and thornlike projections inserted in the orifices of long, oblique, internal trabeculae, other trabeculae distal to these, some extending inwardly from dorsal margin. Aedeagus relatively short, slender, and pointed apically, widened but not troughlike basally.

Measurements

	Males	Females
BL	2.05-2.26	2.24-2.50
TL	0.78-0.81	0.82-0.86
WL	2.30-2.49	2.58-2.69
WW	0.90-1.04	0.96-1.13

Type Data

Male holotype ex *Sturnira bidens* (SVP 4372) and female allotype, same host (SVP 4368), Venezuela, Merida, 6 km ESE Tabay, Middle Refugio, Tabay, 2,550 m, 6-IV-66.

Paratypes—Mérida: 3 males and 3 females ex *Sturnira bidens*, 4 males and 2 females ex 1 *Sturnira*, same data as holotype but 2,550-2,640 m, 6-15-IV-66.

Xenotrichobius, new genus

Type Species: *Xenotrichobius noctilionis* n. sp.

Diagnosis

Head. Superficially resembling that of species of the *Trichobius major* and *caecus* groups. Occipital lobes nearly vertical as in *T. sparsus*, but separated from the laterovertices. Palpi elongate-oval, without ventral setae, except one submarginal one; marginal setae, including apical macrosetae, present.

Thorax. Convex, as deep as wide. Notopleural suture and episternal cleft open, membranous. Mesonotum with typical median and transverse sutures. *Wings.* Vein 5 not extending beyond *r-m* but continuous with it in an even arc which unites with vein 4 just before wing apex. *Legs* elongated, subequal, fore-, mid-, and hindlegs successively slightly longer. Dorsal surface of pro- and metatibiae with rather long semierect setae in rows, the metatibiae with at least several conspicuously longer macrosetae.

Abdomen. Female. Tergum 7 transversely oval, supra-anal plate and ventral arc greatly reduced, all of them feebly sclerotized, the supra-anal plate lacking distal macrosetae. *Male.* Sternum 5 absent, 6 and 7+8 not recognizable; 7+8 may be united with tergum 9 to form the compact hypopygium, but there is no evident suture or other demarcation. Venter with a large, setose cone which arises somewhat anterior to base of hypopygium and projects posteriorly far beyond it. Genitalia complex. Postgonites very thin walled, translucent, much attenuated apically in profile. Aedeagus narrow, ribbonlike, and "coiled" basally; situated within a heavy pouchlike sheath, which apparently is attached to the hypandrium; basal region of the sheath covered on each side with dense, short bristles inserted on translucent plaques; distally the sheath is lightly sclerotized and bilobed, both dorsally and ventrally, the lobes resembling gonites, especially the ventral ones, whose chaetotaxy is also similar.

Discussion

The female of the type species is remarkably similar to those of many species of *Trichobius*, but differs from any of them in the great reduction of the supra-anal plate, in possessing macrosetae on the hind tibiae, and in the unique nature of the wing vein 5. The male, however, is unlike any known streblid, not only in having the peculiar heavily sclerotized ventroapical cone, but also in the complex genitalia. Unfortunately, the condition of the postabdomen of the unique male, including the genitalia, makes interpretation very difficult.

Xenotrichobius noctilionis, new species

(Fig. 30)

Description

Head. Eyes with 9 large facets. Laterovertices and occipital lobes separated, but the lobes nearly vertical. Each laterovertex with 6-7 setae, including a very strong, long, median macroseta and several shorter, strong setae, the others very short. Occipital lobes each with ± 7 setae, including 2 very long macrosetae which are nearly as long as head is wide, 5 other strong setae, including macrosetae of varying lengths, and 2 or more very short setae along posterior margin. Theca distinctly longer than broad, sides arcuate and convergent, labella as long as theca, which has 1 very long slender seta and 1 shorter one posterior to it on each side near apex, 2 strong, rather long discal setae shortly behind these, 1 on each side of median line, and 4 minute setae in a transverse row along base.

Thorax. Anterior margin subtruncate, feebly arcuate. Mesonotum very sparsely setose. Prescutum on each side with ± 9 slender macrosetae–4 of these along lateral margin, 2 on each side in front of transverse suture, 3 in an irregular row extending posteriorly from near apex to slightly beyond middle–and a pair of setae at middle in front of transverse suture, these of variable length, sometimes being slender macrosetae, sometimes short; in addition to these there may be from 2-5 shorter setae near transverse suture and the lateral macrosetae. Scutum with 3 macrosetae and 3 much shorter setae along lateral margins; 2-7 (!) fairly long slender setae in front of scutellum, and 14-15 much shorter ones between these and/or anterior to them on disc. Scutellum with 4 macrosetae, the medial pair longer. Anterior margin of mesosternum pointed between the coxae and bent upward. Metasternal lobe absent. Underside sparsely setose, the setae of mesosternum becoming longer laterally; metasternal setae slightly shorter than those on mesosternum.

Wings. With a fairly long seta at apex of vein 3; setae lacking on underside of veins except on apical fourth of wing; without other distinctive characters, excepting those mentioned in the generic diagnosis.

Legs. Profemora with numerous erect and semierect setae, including 8-10 macrosetae along dorsal edge; 12-13 of the setae along ventral margin very long and erect, those along outer face shorter and erect or semierect; inner face with a few minute, sparse setae which become longer and more noticeable toward apex. Protibiae clothed with moderately short, semierect

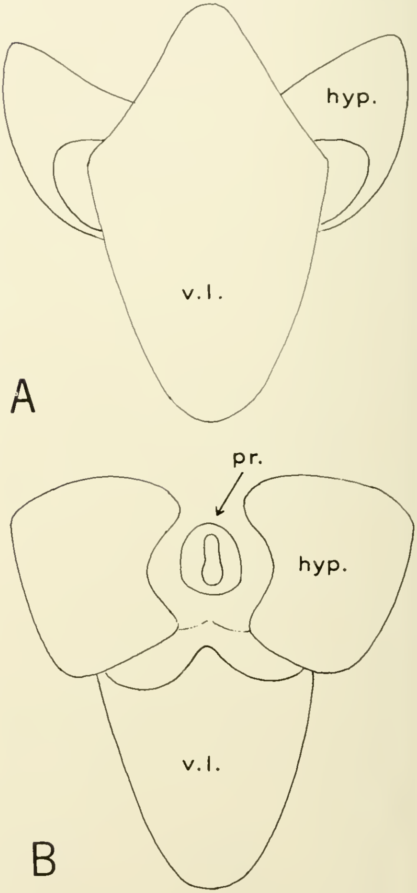

Fig. 30. *Xenotrichobius noctilionis*, new genus, new species (holotype), apex of male abdomen: A, dorsal, and B. ventral, views (setae omitted). *hyp.* = hypopygium (sterna 7+8); *pr.* = proctiger; *v.l.* = ventral lobe.

setae; dorsal margin with a row of about 10 conspicuously longer ones, these about as long as maximum width of tibia; setae becoming much shorter ventrally and apically, the ventral ones microsetae except at apex. Midfemora with ± 4 dorsal macrosetae, a couple of shorter strong setae near apex, and a couple of others on each side near apex; sparse conspicuous setae along lateral face and ventral edge, most of them erect or semierect, a few conspicuously longer ones on apical third or slightly more. Mesotibial chaetotaxy similar to that of protibiae except that the dorsal setae are conspicuously shorter. Hindfemora with a mixture of short to long setae along dorsal surface including 8-9 macroseta, most of these on distal half; lateral face with similar short setae on basal half, and a mixture of short and longer setae on distal half, 7 or 8 of these long macrosetae. Hindtibiae similar to mesotibiae except that the dorsal edge has a submarginal row of setae that are longer than those on the lateral face, and a median row of about 6-8 conspicuous ones, 3-4 of them macrosetae that are distinctly longer than maximum width of tibiae.

Abdomen. Lateral lobes of tergum 1+2 with 18-19 strong setae, including macrosetae, in the female, and ± 24 in the male, some of them longer than in the female. Sternum 2 with sparse setae of about the same length as those on the mesosternum, those in lateral angles distinctly longer. FEMALE. Tergum 7 roundly oval, transverse, with 2-3 short setae on each side; as broad as the inconspicuous, lightly sclerotized, supra-anal plate, which lacks distal macrosetae (!), but has 1-2 short setae along each lateral margin. Dorsolateral connexivum with minute setae, excepting 1 or 2 clusters of longer setae around 7th spiracle; ventral connexival setae short, but stronger than those on sides and dorsum, with conspicuously longer, slender setae intermingled distally. Seventh sternites suborbicular, outer margin oblique; each with ± 19 setae, those along inner margin very short, the others of varying lengths including 4-5 conspicuously longer macrosetae. MALE. Dorsolateral connexival setae short, but much longer than in the female, and very dense; distally the setose area extends nearly across apex; ventral connexival setae shorter and sparser, especially along middle. Sternum 6 not discernable; sterna 7+8 presumably fused with tergum 9 to form the hypopygium, which is covered with numerous short setae, with a few conspicuously longer setae along inner margin and ventrally, 1-2 of these rather slender, but not unusually long, macrosetae. On venter near base of hypopygium is a large (0.3 mm long) cone which extends far beyond the hypopygium; cone with minute setae dorsally, sides with longer setae which become dense, long macrosetae at apex like the dorsal setae; underside of cone with slender setae.

MEASUREMENTS

	Males	Females
BL	3.22	3.00-3.01
TL	0.97	1.01-1.05
WL	2.18	2.48-2.50
WW	1.01	0.98-1.00

TYPE DATA: Holotype male ex *Noctilio leporinus* (FMNH) 93205), Surinam, Kaiserberg airstrip, east of Zuid River, 900 ft, 12-X-60, H. A. Beatty (FMNH Guianan Zool. Exped. 1960-61). PARATYPES—VENEZUELA. APURE: 1 female (IZUCV) ex *Noctilio labialis* (SVP 5719), 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 17-XII-65. T. F. AMAZONAS: 1 female (USNM) ex *Noctilio leporinus* (SVP 15678), 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 12-I-67.

Genus *Anatrichobius* Wenzel

Anatrichobius Wenzel, 1966:502

TYPE SPECIES: *Anatrichobius scorzai* Wenzel, 1966:503

Anatrichobius scorzai Wenzel

(Fig. 31, 32)

Anatrichobius scorzai Wenzel, 1966:503, Fig. 76-78

VENEZUELAN SURVEY RECORDS (11 males, 3 females)

BARINAS: 1 male ex 1 *Lonchophylla robusta*, 2 km SW Altamira, Altamira, 620 m, 26-XII-67.

BOLÍVAR: 1 male ex *Myotis oxyotus*, 21 km NE Icabarú, El Paují, Icabarú, 851 m, 3-V-68; 1 female, same host, 85 km SSE El Dorado, Km 125, 826 m, 16-V-66.

CARABOBO: 3 males ex *Myotis keaysi*, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 28-XI-67.

DTO. FEDERAL: 1 female ex *Myotis keaysi*, 4 km NNW Caracas, Los Venados, 1,400 m, 1-VIII-65.

MIRANDA: 1 male ex *Myotis oxyotus*, 33 km WSW Caracas, Alto Ño Léon, 1,950 m, 27-V-67; 5 males and 1 female ex *Myotis keaysi*, 5 km NNW Guarenas, Curapao, 1,160 m, 5-X-66.

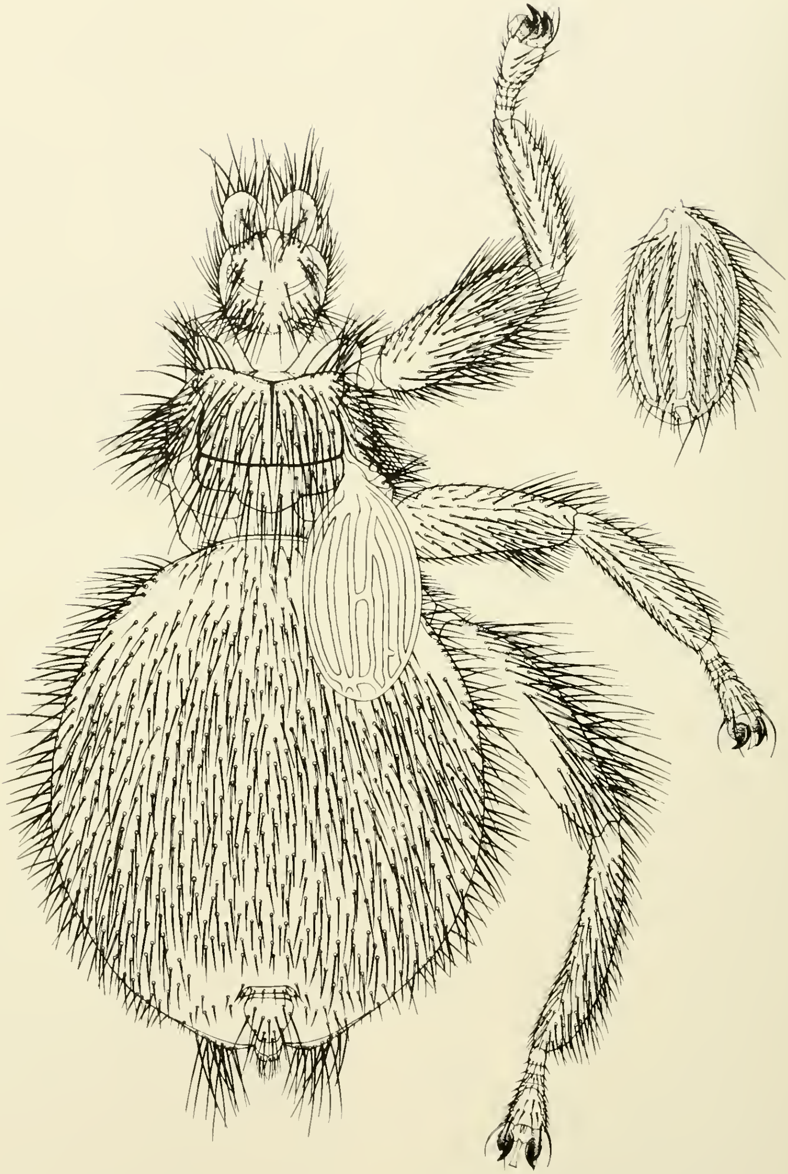

Fig. 31. *Anatrichobius scorzai* Wenzel, female: dorsal view and right wing. From Wenzel et al. (1966).

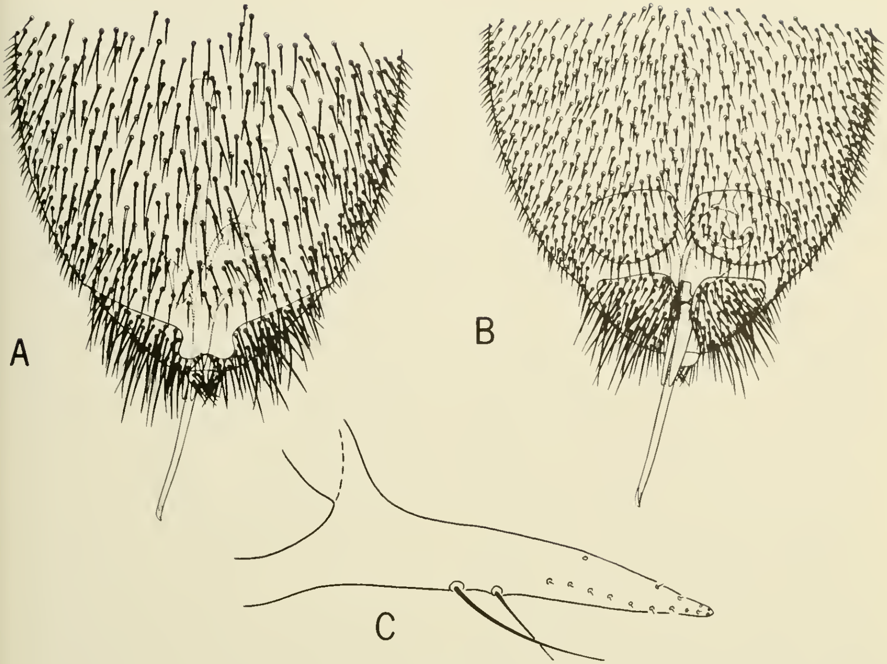

Fig. 32. *Anatrichobius scorzai* Wenzel, male: A, dorsal, and B, ventral, view of apex of abdomen; C, left postgonite. From Wenzel et al. (1966).

OTHER MATERIAL EXAMINED

COSTA RICA: 10 males and 7 females ex 4 *Myotis keaysi*, 3 males and 2 females ex 2 *Myotis nigricans*, 5 males and 3 females ex 1 *Myotis oxyotus* and 1 female ex 1 *Myotis* sp. (probably "*nigricans*"), Puntarenas, Monteverde, 1,400 m, various dates, 1973-74, R. K. LaVal.

HONDURAS: 1 male and 1 female ex *Myotis keaysi*, Francisco Morazan, 11 km W Morazan, 26-VII-69, R. K. LaVal.

HOST ASSOCIATIONS

The holotype of *Anatrichobius scorzai* was reported from *Myotis* sp. (Panama). The original series included specimens from: Panama, ex *Myotis nigricans* and *M. chiloensis* (= *oxyotus*); Venezuela, ex *M. nigricans;* Colombia, ex *M. nigricans;* and Peru, ex *M. chiloensis oxyotus*. Dr. Richard LaVal has restudied many of the host specimens on which these records are based and has informed me (pers. comm.) that most of the original identifications were incorrect. He determined the hosts of the Venezuelan specimens as *M. keaysi*, the hosts of all the Panamanian specimens (and thus, also of the type) taken from the cave at Cerro Punta, Chiriqui, as *M. oxyotus*, and of the Peruvian specimens as *M. oxyotus*. Some bats taken at a slightly lower elevation at Cerro Punta were *M. keaysi*, and thus some paratypes may be from that host. LaVal did not examine the hosts of the Colombian paratypes but stated (loc. cit.) "that from 2,350 meters they probably are either *keaysi* or *oxyotus* and not likely to be *nigricans*."

Thus it would appear that the characteristic hosts of *A. scorzai* are *M. keaysi* and *M. oxyotus*. According to LaVal (loc. cit.), "It is perhaps not surprising that *keaysi* and *oxyotus* share the same parasites . . . since they are both cave bats, and both live in wet mountain forests." Its known distribution now includes Honduras, Costa Rica, Panama, Colombia, Peru, and Venezuela.

In Costa Rica (Puntarenas, Monteverde,

1,400 m, 12-VIII-73 and 8-XII-73) LaVal also collected specimens of the related *Joblingia schmidti* together with *A. scorzai* on both *M. keaysi* and *M. nigricans.* The type of *J. schmidti,* from Guatemala, was reported (Wenzel and Dybas, 1947) as being from *Myotis velifer.* LaVal has reexamined the series of bats from which the type of *schmidti* was taken and found them to be *M. keaysi.* Wenzel et al. (1966:509) reported *J. schmidti* from *M. nigricans* and *M. chiloensis* from Panama. LaVal has reidentified all of these bats as *M. oxyotus* (= *chiloensis*).

Genus *Trichobioides* Wenzel

Trichobioides Wenzel, 1966:510

Type Species: *Trichobius perspicillatus* Pessòa and Galvão, 1937:1

Trichobioides perspicillatus (Pessòa and Galvão)

Trichobius perspicillatus Pessòa and Galvão, 1938:1, Fig. 1-3 (see no. p. 225)

Trichobioides perspicillatus, Wenzel, Tipton, and Kiewlicz, 1966:511, Fig. 81, 82A.

Venezuelan Material Examined (408 males, 273 females, 8 sex undet.)

This characteristic parasite of *Phyllostomus discolor* was collected wherever that host occurred. It was taken at 30 localities in 12 states as follows: Aragua (1 locality), Barinas (1 locality, 611-620 m), Bolívar (2 localities, 150-306 m), Carabobo (2 localities, 60-598 m), Dto. Federal (1 locality, 380 m), Falcón (4 localities, 25-480 m), Guárico (1 locality, 630 m), Miranda (3 localities, 1-60 m), Monagas (2 localities, 18-1,165 m), Sucre (3 localities, 1-380 m), T. F. Amazonas (4 localities, 140-195 m), Trujillo (1 locality, 90 m), Zulia (7 localities, 24-270 m).

Host Associations

Of 689 specimens of *Trichobioides perspicillatus* collected by the survey teams, 668 (97 percent) were from *Phyllostomus discolor,* and the remaining 21 specimens were from 9 other bats of 5 species. While most of these other records probably represent transitory associations or contaminations, several appear to have resulted from mislabeling or misinterpretation of field numbers in the laboratory, namely those from *Carollia perspicillata, Artibeus jamaicensis, Glossophaga longirostris, Eumops glaucinus,* and *Sturnira lilium.* Interestingly, this fly was never taken from *Phyllostomus elongatus,* though *Strebla consocius,* another characteristic parasite of *Phyllostomus discolor,* was commonly found on that host.

Genus *Paratrichobius* Lima

Paratrichobius Lima, 1921:20

Type Species: *Trichobius longicrus* Ribeiro, 1907:236

This genus is taxonomically very complex (Wenzel et al., 1966: 519 pp.). I believe it will be possible to revise or partially revise the species only when a significant amount of additional material with reliable host associations has accumulated.

Provisional Key to the Venezuelan Species of *Paratrichobius*

1. Inner face of profemora with only 2 or 3 short spinlets and/or setae medial and parallel to posterior end of oblique row of spines or heavy setae (Fig. 34A, 35A) 2

Inner face of profemora with a complete row of setae medial and parallel to the oblique row of spines or strong setae (Fig. 33A, 35B) 3

2. Mesonotal chaetotaxy as in Fig. 34A. Male. Inner ventroapical margins of hypopygium with spinelike setae (Fig. 37A). Hosts: species of *Uroderma* .... *dunni* Curran

Mesonotal chaetotaxy as in Fig. 35A. Male. Inner ventroapical margins of hypopygium with normal setae as in *Paratrichobius longicrus* (Fig. 37B). Hosts: species of *Chiroderma, Vampyressa, Vampyrodes, Vampyrops* .... *salvini* complex

3. Inner face of profemora with 7 spines or stout setae in a diagonal row. Hindfemora shorter, rarely as long as 1.26 mm 4

Inner face of profemora with 6 stout spines. Hindfemora longer, 1.32-1.77 mm long .... *longicrus* complex

4. Inner face of profemora with stout spines. Male. Inner ventroapical margins of hypopygium with normal setae. Host: *Artibeus hartii* .... *sanchezi* Wenzel

Inner face of profemora with a diagonal row of strong setae, not spines. Mesonotal chaetotaxy as in Fig. 35B. Male. Inner ventroapical margins of hypopygium with stout spinelike setae as in *dunni.* Host: *Artibeus cinereus* and *A. watsoni* . *lowei* Wenzel

Paratrichobius lowei Wenzel
(Fig. 35B)

Paratrichobius lowei Wenzel, 1966:528, Fig. 92B, 93

Venezuelan Survey Records (8 males, 4 females)

BOLÍVAR: 8 males and 4 females ex 9 *Artibeus cinereus*, 85 km SSE El Dorado, Km 125, 826-1,032 m, 12-19-V-66.

Remarks

The type and paratypes of *Paratrichobius lowei* were taken from *Artibeus watsoni* in Panama.

Paratrichobius sanchezi Wenzel

Paratrichobius sanchezi Wenzel, 1966:530, Fig. 92C, 94

Venezuelan Survey Records (43 males, 28 females ex *Artibeus hartii*)

CARABOBO: 2 females, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 6-7-VIII-68.

DTO. FEDERAL: 11 males and 11 females, 4 km NNW Caracas, Los Venados, 1,400-1,559 m, 21-VII–15-VIII-65; 22 males and 12 females, 5 km NNE Caracas, nr. Hotel Humboldt, Pico Ávila, 2,092-2,240 m, 20-VIII–27-IX-65; 8 males and 1 female, 6 km NNW Caracas, nr. Boca Tigre, Pico Ávila, 1,982-2,013 m, 24-30-VIII-65.

GUÁRICO: 1 female, 10 km NE Altagracia, Hda. Elvira, 630 m, 16-IX-66.

MONAGAS: 1 female, 5 km NW Caripe, San Agustín, 1,160 m, 6-VII-67.

ZULIA: 2 males, 19 km WSW Machiques, Novito, 1,135 m, 4-V-68.

Remarks

The holotype, allotype, and 1 paratype were taken from *Artibeus hartii* in Panama, as were a series of paratypes from the Biological Station at Rancho Grande in Venezuela.

Paratrichobius dunni (Curran)
(Fig. 34, 37A)

Speiseria dunni Curran, 1935:7, Fig. 6

Paratrichobius dunni Wenzel, Tipton, and Kiewlicz, 1966:527, Fig. 90, 91A, 92A

Venezuelan Survey Records (61 males, 40 females, 1 sex undet.)

APURE: 1 male ex *Uroderma magnirostrum*, 5 males and 2 females ex *Uroderma bilobatum*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 29-I–6-II-68.

BARINAS: 13 males and 6 females ex *Uroderma bilobatum*, 2 km SW Altamira, Altamira, 609-620 m, 26-XII-67–5-I-68; 1 female, same host, Altamira, 794 m, 21-XII-67.

BOLÍVAR: 1 male and 2 females ex *Uroderma bilobatum*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 13-20-VI-66; 2 males and 1 female, same host, 45 km NE Icabarú, Santa Lucia de Surukun, Icabarú, 851 m, 29-IV-68.

DTO. FEDERAL: 1 male ex *Uroderma bilobatum*, nr. El Limón, 48 km W Caracas, Hda. Carapiche, 398 m, 19-VIII-66.

FALCÓN: 1 sex undet. ex *Uroderma magnirostrum*, 2 males and 1 female ex *Uroderma bilobatum*, 28 km WNW Pto. Cabello, Boca de Yaracuy, 2 m, 23-IX–4-X-65; 1 male and 2 females, same host, 14 km ENE Mirimire, nr. La Pastora, 60-122 m, 21-27-XI-67; 2 males and 1 female, same host, 16 km ENE Mirimire, nr. La Pastora, 70 m, 28-29-XI-67.

MIRANDA: 1 male and 1 female ex *Uroderma bilobatum*, 1 km S Río Chico, 1 m, 25-X–2-XI-66; 5 males and 1 female, same host, Birongo, 60 m, 21-23-I-68.

SUCRE: 2 males ex *Uroderma bilobatum*, 9 km NE Güiria, Ensenada Cauranta, 7 m, 13-VI-67.

T. F. AMAZONAS: 1 male ex 1 *Desmodus rotundus*, 1 male and 3 females ex *Uroderma magnirostrum*, 1 male and 1 female ex *Uroderma bilobatum*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 11-27-VII-67; 1 male ex *Uroderma magnirostrum*, Río Orinoco, Tamatama, 135 m, 28-IV-67; 4 males ex *Uroderma bilobatum*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 6-I–3-II-67; 1 male, same host, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 8-X-67; 2 males, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 14-IV-67.

TRUJILLO: 2 females ex *Uroderma bilobatum*, 46 km WNW Valera, La Ceiba, 29 m, 28-X-65; 1 female, same host, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 6-X-65.

YARACUY: 1 male and 2 females ex *Uroderma bilobatum*, 10 km NW Urama, El Central, Urama, 25 m, 14-21-III-66; 1 male and 2 females, same host, 11 km NW Urama, El Central, Urama, 25 m, 22-III-66.

ZULIA: 1 male ex *Uroderma magnirostrum*, 1 female ex *Uroderma bilobatum*, 39 km WNW Encontrados, El Rosario, 37 m, 31-III–1-IV-68; 5 males and 5 females, same host, 1 male ex *Uroderma magnirostrum*, 42 km WNW Encontrados, El Rosario, 24 m, 3-III–5-V-68; 1 male and 2 females ex *Uroderma bilobatum*, 48 km WNW Encontrados, El Rosario, 54 m, 24-27-II-68; 2 males and 1 female, same host, 60 km WNW Encontrados, Boca del Río de Oro, El Rosario, 73 m, 18-19-III-68; 1 male, same host, 63 km WNW Encontrados, La Rinconada, El

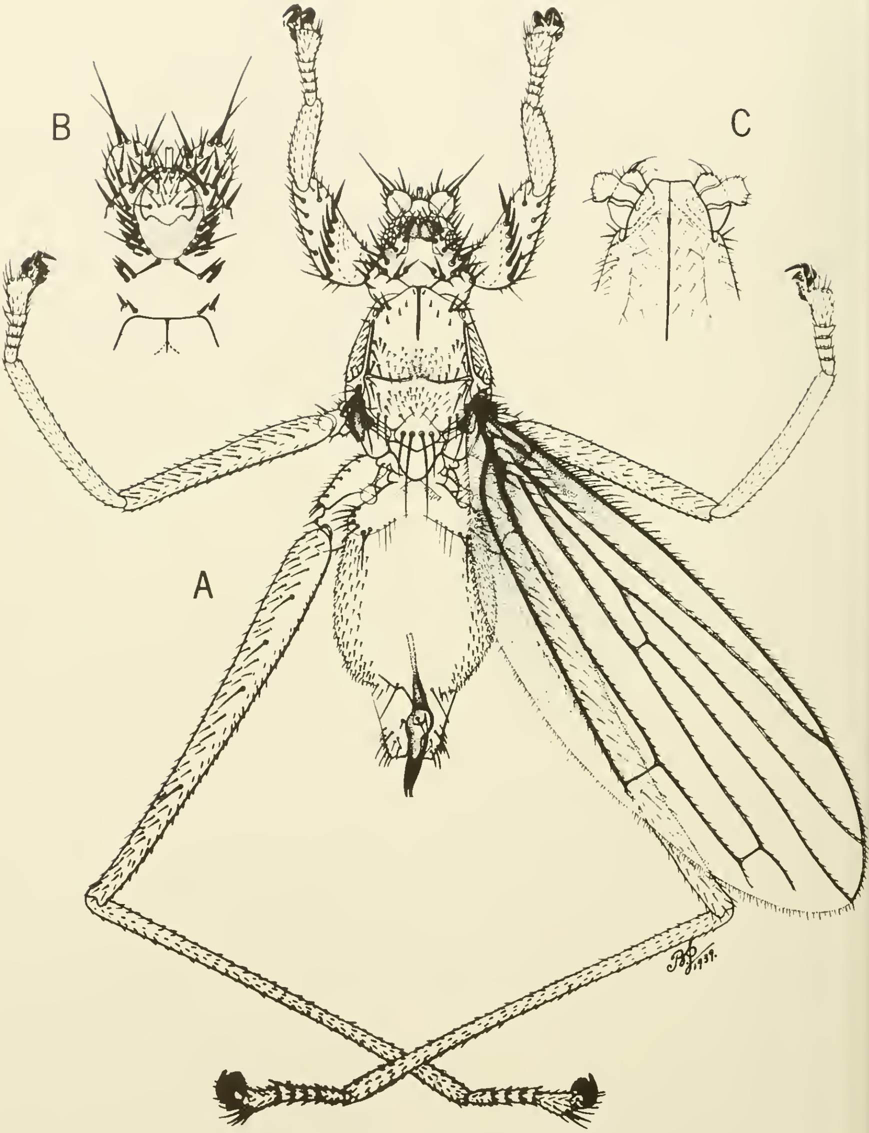

Fig. 33. *Paratrichobius longicrus* Ribeiro, dorsal view. From Jobling (1939).

Rosario, 125 m, 28-II-68; 2 females, same host, 21 km SW Machiques, Kasmera, 270 m, 17-IV-68; 1 male, same host, 33 km NW La Paz, nr. Cerro Azul, 75 m, 15-VI-68.

Paratrichobius salvini Wenzel

(Fig. 35A)

Paratrichobius salvini Wenzel, 1966:532, Fig. 95, 95C

Only specimens taken from *Chiroderma salvini* are recorded here as *Paratrichobius salvini.* Specimens from several other hosts are extraordinarily similar, but most of them exhibit differences that correlate with host species in absolute and relative length of wings and hindlegs and in some other character states. Some may be *salvini;* some are the entities recorded by Wenzel et al. (op. cit., p. 535) as *Paratrichobius* species A and B. The collections at hand appear to be inadequate to characterize these populations.

Venezuelan Survey Records (5 males ex *Chiroderma salvini*)

CARABOBO: 1 male, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 29-XI-67.

DTO. FEDERAL: 2 males, 6 km NNW Caracas, nr. Boca Tigre, Pico Ávila, 2,118-2,119 m, 30-VIII-65.

MIRANDA: 1 male, 21 km NW Altagracia, Parque Nac. Guatopo, 630 m, 23-IX-66.

MONAGAS: 1 male, 5 km NW Caripe, San Agustín, 1,165 m, 28-VI-67.

Paratrichobius species (*salvini* complex)

Venezuelan Survey Records (51 males, 24 females, 2 sex undet.)

APURE: 4 males ex *Vampyrops helleri,* 1 female ex *Chiroderma villosum,* 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 17-I–6-II-68.

BARINAS: 13 males, 10 females, and 2 sex undet. ex *Vampyrops helleri,* 2 km SW Altamira, Altamira, 611-619 m, 31-XII-67–2-II-68; 4 males and 1 female, same host, 1 male ex *Chiroderma trinitatum,* Altamira, 794 m, 19-21-XII-67.

CARABOBO: 1 male and 2 females ex *Vampyrops helleri,* 4 km NW Montalbán, 1,537 m, 27-29-XI-67; 1 male, same host, 3 km SW Montalbán, Hda. La Canada, Montalbán, 618 m, 22-XI-67.

FALCÓN: 1 male ex *Vampyrops helleri,* 14 km ENE Mirimire, nr. La Pastora, 122 m, 11-XI-67; 1 female, same host, 19 km NW Urama, Km 40, Urama, 25 m, 20-X-65.

SUCRE: 1 female ex 1 *Vampyrops brachycephalus,* 1 male ex 1 *Phyllostomus hastatus,* 26 km ESE Carúpano, Manacal, 175-300 m, 20-31-VII-67.

T. F. AMAZONAS: 2 males ex *Vampyrops helleri,* 1 male and 1 female ex *Chiroderma villosum,* 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 6-27-VII-67; 1 male ex 1 *Vampyrodes caraccioli,* 56 km NNW Esmeralda, Caño Essa, Belén, 150 m, 14-II-67; 1 male ex *Vampyressa bidens,* 20 km S Pto. Ayacucho, Las Queseras, Pto. Ayacucho, 135 m, 24-IX-67; 2 males and 2 females, same host, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 4-8-X-67; 1 male ex *Chiroderma villosum,* 14 km SSE Pto. Ayacucho, Chaparito, Pto. Ayacucho, 119 m, 2-X-67.

YARACUY: 16 males and 3 females ex *Vampyrops helleri,* 7 males and 3 females ex *Chiroderma villosum,* 20 km NW San Felipe, Minas de Aroa, 395-400 m, 6-22-XII-67; 1 female, same host, 11 km NW Urama, El Central, Urama, 25 m, 22-III-66.

ZULIA: 1 female ex *Vampyrops helleri,* 4 males and 1 female ex *Chiroderma villosum,* 42 km WNW Encontrados, El Rosario, 24 m, 4-5-III-68; 1 male ex *Vampyrops helleri,* 2 males and 1 female ex *Chiroderma villosum,* 48 km WNW Encontrados, El Rosario, 54 m, 25-26-II-68; 1 male ex *Vampyrops helleri,* 63 km WNW Encontrados, La Rinconada, El Rosario, 125 m, 28-II-68; 1 male and 1 female, same host, 65 WNW Encontrados, Caño Azul, El Rosario, 95 m, 1-I-68.

Paratrichobius longicrus (Ribeiro)

(Fig. 33, 37B)

Trichobius longicrus Ribeiro, 1907:236, Pl. 25

Paratrichobius longicrus Wenzel, Tipton, and Kiewlicz, 1966:521, Fig. 89

Wenzel et al.(loc. cit.) provisionally accepted *Artibeus jamaicensis* as the type host of *Paratrichobius longicrus,* as given by Ribeiro (loc. cit.). However, they pointed out that this host is seldom parasitized by species of *Paratrichobius* but, rather, by *Megistopoda aranea.* The data from the Venezuelan Survey collections clearly bear this out. Of 231 specimens of the *longicrus* complex that were taken from fruit bats, only 1 was from *A. jamaicensis,* while 190 were from 136 *Artibeus lituratus.* On the other hand, 529 *M. aranea* were taken from 326 *A. jamaicensis,* but only 2 from *A. lituratus.* According to Dr. Lindolpho Guimarães (pers. comm.), the type of *longicrus* was taken from a bat collected from a palm tree outside the National Museum at Rio

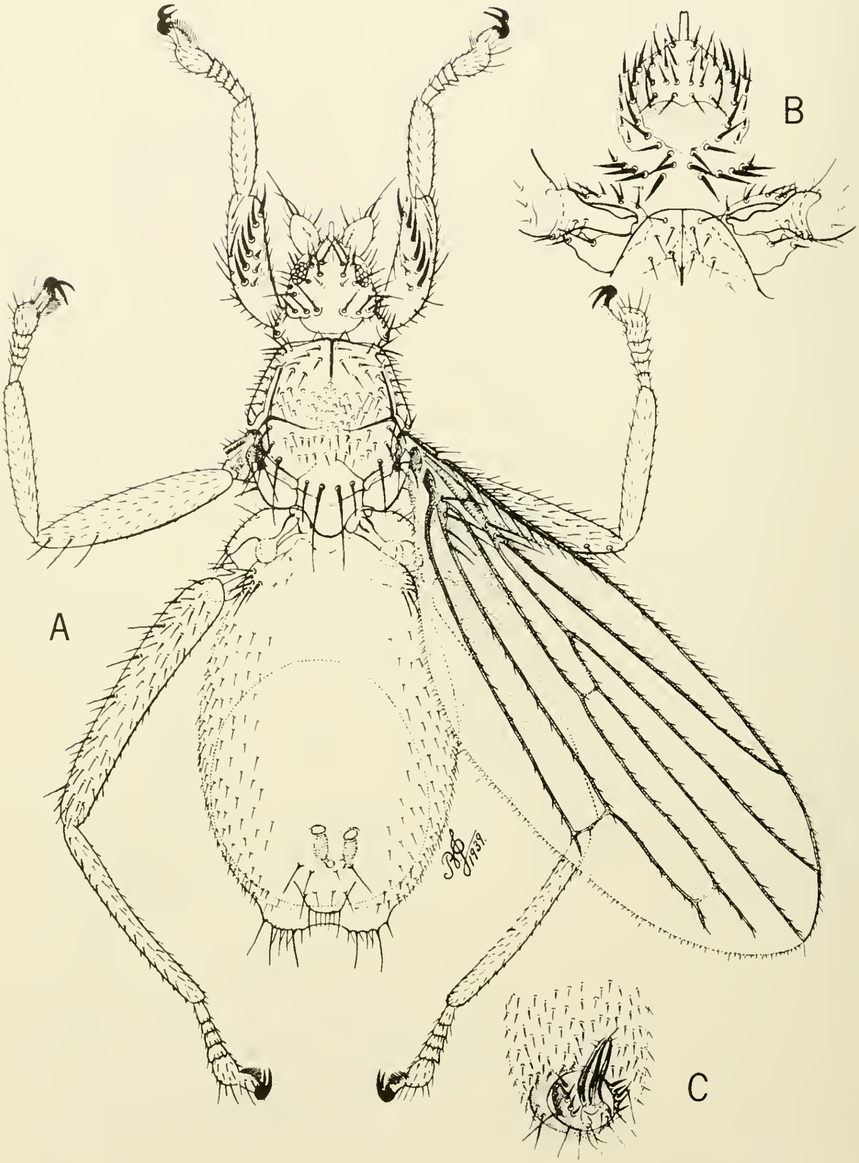

Fig. 34. *Paratrichobius dunni* (Curran), dorsal view. From Jobling (1939).

de Janeiro. In that locality and roosting site, the host was more apt to be *A. lituratus* than *jamaicensis*, although this species, too, may roost in palms. However, if the host was correctly identified, then in all likelihood the type of *longicrus* was a transfer or contaminant from *A. lituratus*.

I was not able to locate the type of *longicrus* in the collection at the National Museum in Rio de Janeiro, but I am unwilling to designate a neotype until further research shows that the type no longer exists. Since the evidence indicates that *A. lituratus* is the characteristic host, I regard specimens from that host as being *P. longicrus* Ribeiro. Jobling's excellent illustration (Fig. 33) of *longicrus* is of a specimen from *Artibeus lituratus*. Specimens from other hosts are recorded under "*Paratrichobius* species (*longicrus complex*)." See also Wenzel et al. (op. cit.).

Venezuelan Survey Records (103 males, 85 females, 4 sex undet.)

APURE: 23 males, 22 females, and 1 sex undet. ex *Artibeus lituratus*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 17-I–5-II-68.

BARINAS: 1 male and 3 females ex *Artibeus lituratus*, Altamira, 794 m, 9-11-I-68.

BOLÍVAR: 3 males and 1 female ex *Artibeus literatus*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 9-23-VI-66; 2 males, same host, 20 km W La Paragua, Hato San José, 300-306 m, 6-III–6-IV-67; 2 males and 2 females, same host, 85 km SSE El Dorado, Km 125, 602-1,032 m, 16-17-V-66.

CARABOBO: 1 male and 1 female ex *Artibeus lituratus*, 2 km SE Montalbán, Potrerito, Montalbán, 598 m, 1-XI-67; 2 males and 1 female, same host, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 28-30-XI-67.

DTO. FEDERAL: 8 males and 5 females ex *Artibeus lituratus*, 4 km NNW Caracas, Los Venados, 1,487-1,524 m, 21-VII–15-VIII-65.

FALCÓN: 1 male ex *Artibeus lituratus*, 28 km WNW Pto. Cabello, Boca de Yaracuy, 2 m, 4-X-65; 1 female, same host, 14 km ENE Mirimire, nr. La Pastora, 122 m, 11-XI-67; 2 females, same host, 16 km ENE Mirimire, nr. La Pastora, 70 m, 28-XI–1-XII-67; 10 males and 9 females, same host, 80 km NW Carora, Río Socopito, 470-480 m, 21-29-V-68; 3 males and 1 female, same host, 19 km NW Urama, Km 40, Urama, 25 m, 22-25-X-65.

MIRANDA: 3 males and 1 female ex *Artibeus lituratus*, 1 km E Río Chico, 1 m, 21-XI-66; 2 males and 2 females, same host, Birongo, 60 m, 22-23-I-68; 2 males, same host, 5 km NNW Guarenas, Curupao, 1,130-1,160 m, 13-14-X-66; 1 female, same host, 21 km NW Altagracia, Parque Nac. Guatopo, 630 m, 28-IX-66.

NUEVA ESPARTA: 1 male ex *Artibeus lituratus*, 3 km NNE La Asunción, Isla Margarita, 38 m, 9-I-67.

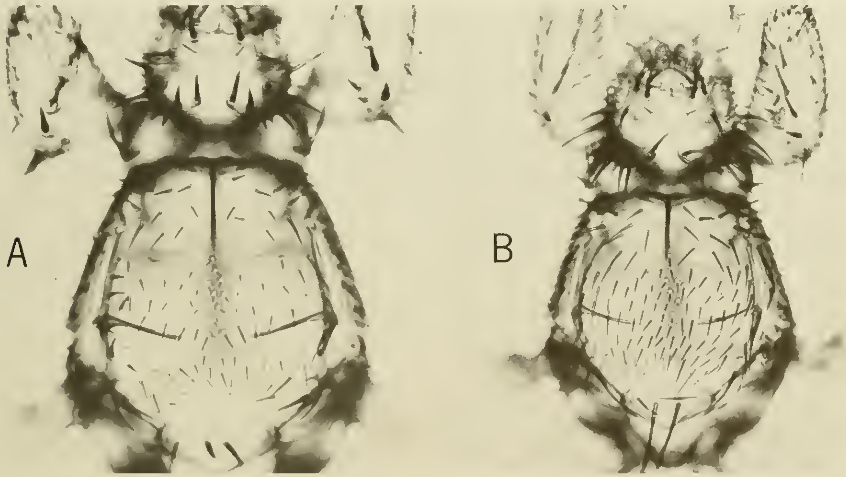

Fig. 35. Thorax, dorsal view: A, *Paratrichobius salvini* Wenzel; B, *Paratrichobius lowei* Wenzel. From Wenzel et al. (1966).

SUCRE: 3 females ex *Artibeus lituratus*, 21 km E Cumaná, 1 m, 14-XII-66; 2 males and 1 sex undet., same host, 12 km NE Güiria, Ensenada Cauranta, 90 m, 17-19-VI-67; 2 males and 1 female, same host, 9 km NE Güiria, Ensenada Cauranta, 2-4 m, 3-6-VI-67; 1 male, same host, 26 km ESE Carúpano, Manacal, 366 m, 19-VII-67.

T. F. AMAZONAS: 1 male ex *Artibeus lituratus*, 32 km S Pto. Ayacucho, Pto. Ayacucho, 135 m, 13-X-67; 1 male, same host, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 9-X-67; 1 male, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 12-VII-67; 2 males and 2 females, Río Orinoco, Tamatama, 135 m, 8-9-V-67.

TRUJILLO: 2 females ex *Artibeus lituratus*, 48 km WNW Valera, La Ceiba, 28 m, 5-XI-65; 1 female, same host, 20 km WNW Valera, nr. Sabana de Mendoza, Valera, 134 m, 27-VIII-65; 1 male, same host, 23 km N Valera, nr. Agua Viva, Valera, 164 m, 23-X-65; 1 female, same host, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 15-VIII-65.

YARACUY: 1 male ex *Artibeus lituratus*, 20 km NW San Felipe, Minas de Aroa, 395 m, 14-XII-67.

ZULIA: 1 male and 1 female ex *Artibeus lituratus*, 42 km WNW Encontrados, El Rosario, 24 m, 5-III-68; 7 males and 6 females, same host, 48 km WNW Encontrados, El Rosario, 54 m, 25-27-II-68; 2 females, same host, 57 km WNW Encontrados, Espana, El Rosario, 61 m, 27-III-68; 1 female and 1 sex undet., same host, 60 km WNW Encontrados, Boca del Río de Oro, El Rosario, 73 m, 19-III-68; 9 males, 8 females, and 1 sex undet., same host, 63 km WNW Encontrados, La Rinconada, El Rosario, 125 m, 27-29-II-68; 7 males and 4 females, same host, 21 km SW Machiques, Kasmera, 270 m, 17-24-IV-68; 3 males and 1 female, same host, 19 km WSW Machiques, Novito.

Other Venezuelan Material Examined

ARAGUA: 1 sex undet. ex *Artibeus lituratus*, Rancho Grande (El Limón), 30-III-60, C. O. Handley, Jr.

Paratrichobius species (*longicrus* complex)

Venezuelan Survey Records (79 males, 56 females, 1 sex undet.)

APURE: 1 female ex 1 *Desmodus rotundus*, 1 male ex 1 *Carollia perspicillata*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 24-31-I-68.

BARINAS: 1 male ex *Vampyrops vittatus*, 2 km SW Altamira, Altamira, 619 m, 5-I-68.

BOLÍVAR: 18 males, 9 females, and 1 sex undet. ex *Vampyrops aurarius*, 85 km SSE El Dorado, Km 125, 889-1,165 m, 23-III–26-V-66.

CARABOBO: 3 males and 1 female ex *Vampyrops umbratus*, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 29-XI–1-XII-67.

DTO. FEDERAL: 3 males and 2 females ex *Vampyrops vittatus*, 20 males and 13 females ex *Vampyrops umbratus*, 4 km NNW Caracas, Los Venados, 1,400-1,559 m, 22-VII–15-VIII-65; 1 male and 4 females, same host, 1 female ex *Vampyrops vittatus*, 6 km NNW Caracas, nr. Boca Tigre, Pico Ávila, 2,025-2,119 m, 30-VIII-65, 8 males and 3 females ex *Vampyrops umbratus*, 33 km WSW Caracas, Alto Ño Léon, 1,665 m, 25-26-V-67; 1 male and 2 females, same host, 1 male ex *Artibeus jamaicensis*, 5 km NW Caracas, nr. Clavelitos, Boca Tigre Valley, 1,394 m, 27-VIII-65; 10 males and 9 females, same host, 5 km NNE Caracas, nr. Hotel Humboldt, Pico Ávila, 2,092-2,240 m, 18-VIII–27-IX-65.

MIRANDA: 8 males and 9 females ex *Vampyrops umbratus*, 5 km NNW Guarenas, Curupao, 1,160-1,180 m, 6-14-X-66; 1 female, same host, 5 km NNE Caracas, nr. Hotel Humboldt, Pico Ávila, 2,124 m, 13-IX-65.

MONAGAS: 1 male ex *Vampyrops umbratus*, 3 km NW Caripe, nr. San Agustín, 1,165 m, 1-VII-67; 1 male, same host, 5 km NW Caripe, San Agustín, 1,180 m, 14-VII-67.

T. F. AMAZONAS: 1 female ex *Vampyrops aurarius*, Caño Culebra, 50 km NNW Esmeralda, Cerro Duida, 800 m, 17-I-67.

ZULIA: 1 male ex *Glossophaga soricina*, 48 km WNW Encontrados, El Rosario, 54 m, 27-II-68.

Other Venezuelan Material Examined

ARAGUA: 1 male and 1 female ex *Vampyrops dorsalis* (= *V. umbratus*), Rancho Grande, Biol. Station, 1,090 m, 10-VIII-62, C. and A. J. Machado.

CARABOBO: 2 males and 1 female ex *Myotis* sp. (!), Yuma, 2-VII-55, F. Fernandez Y.

DTO. FEDERAL: 1 male and 1 female ex *Vampyrops* sp., Silla de Caracas, 2,200 m, 21-X-62, J. Ojasti.

Genus *Neotrichobius* Wenzel and Aitken

Neotrichobius Wenzel and Aitken, 1966:536

Type Species: *Neotrichobius stenopterus* Wenzel and Aitken, 1966:539

Wenzel and Aitken (loc. cit.) erected this genus for a new species, *Neotrichobius stenopterus*, from Panama, Surinam, and Trinidad. Earlier that year, Machado-Allison (1966:76) described a species of this genus under the name *Pterellipsis delicatus*. In 1970 (p. 100.9), Wenzel placed *stenopterus* as a synonym of *delicatus*. Study of the extensive Venezuelan series of *Neotrichobius* from a number of hosts shows that *stenopterus* and *delicatus* are distinct and that "*delicatus*" may in fact be a species complex. Restudy of the type series of *stenopterus* shows that it included two Panamanian specimens of *delicatus*, one Trinidadian specimen of the "*delicatus* complex," and one specimen (Surinam) of *bisetosus* n. sp.

The known species of *Neotrichobius* parasites of bats of the Subfamily Stenodermatinae and of *Rhinophylla pumilio* (Subfamily Carolliinae).

Key to the Species of *Neotrichobius*

1. Second (most posterior) longitudinal wing vein continuing beyond *r-m* to apex of wing where it unites with costa 3
   Second vein not reaching apex, extending only a little beyond *r-m* as a spur (Fig. 36B) 2
2. Scutellum with 2 macrosetae only .... *bisetosus* n. sp.
   Scutellum with a pair of median macrosetae and, on each side of these, a seta that is half as long .... *stenopterus* Wenzel and Aitken
3. Row of setae along dorsoposterior margin of tergum 1+2 interrupted at middle. Wing vein *r-m* situated at or beyond midlength of wing .... *ectophyllae* n. sp.
   Row of setae along dorsoposterior margin of tergum 1+2 not interrupted but doubled at middle. Vein *r-m* situated before midlength of wing .... *delicatus* Machado-Allison

Neotrichobius stenopterus Wenzel and Aitken
(Fig. 36, 37D)

Neotrichobius stenopterus Wenzel and Aitken, 1966:539, Fig. 97-99.—Wenzel, 1970:9 (as syn. of *delicatus* Machado-Allison, in error)

This species was not collected in Venezuela, but, based on distributions of other parasites, I would not be surprised if it were found on *Artibeus cinereus* in Trujillo and Zulia. Specimens of this host were collected in those states, but no flies were recovered from them. It should be noted that in Panama most specimens were taken from *A. cinereus* (possibly *A. watsoni* or *A. phaeotis*), but in Venezuela only specimens of the "*delicatus*" complex were taken from this host.

The character states which distinguish *stenopterus* from the other species are given in the key and in the descriptions of the new species. As noted above, the paratype series of *stenopterus* was a mixture of three species.

Neotrichobius bisetosus, new species
(Fig. 37E)

Neotrichobius stenopterus Wenzel and Aitken, 1966:539 (part, Surinam record ex *Phyllostomus hastatus*)

Closest to *Neotrichobius stenopterus* in head structure, wing venation, and chaetotaxy, but conspicuously different from it and other species in having only 2 scutellar setae instead of 4, and in having femora nearly thrice (rather than twice) as long as the thorax. The outer pair of scutellar setae are frequently absent in *delicatus*, but such specimens can be readily separated from *bisetosus* by the wing venation and length of the hindfemora, which are only as long as the thorax in *delicatus*.

Description

The description of *Neotrichobius stenopterus* applies equally well to *bisetosus* except as follows: *Head.* Eyes with 14 facets (15-16 in *stenopterus*). Each laterovertex usually with 6, rarely 5 setae (5 in *stenopterus*), 2 of them long, strong macrosetae, the others of varying lengths, but at least 1 very short. Posterior margin of occipital lobes usually with 4, sometimes 5 (rather than 5-6) strong, short setae, and below these a row of 4-5 very short inconspicuous spinelets (these conspicuous, stout, and longer in *stenopterus*). Outer pair of basal row of thecal setae distinctly longer and stronger than the median pair (all short, subequal in *stenopterus*).

Thorax. Prescutum with the usual short setae on each side of median suture near anterior margin; with 1-2 very stout setae near inner margin of spiracle (3-4, rarely 2 *stenopterus*); 2 short setae on each side, medial to these spiraculars (1, rarely 2 in *stenopterus*); at center on each side is 1 longer seta that is much weaker than the spiraculars, and about twice as long as the short setae anterior to it; posterolateral angles with 1-3 (usually 2) setae, 1 longer than the others, along margin (as opposed to usually 1, sometimes 2, rarely 3 in *stenopterus*); with 2-3 (rarely 1) minute setae, at least on

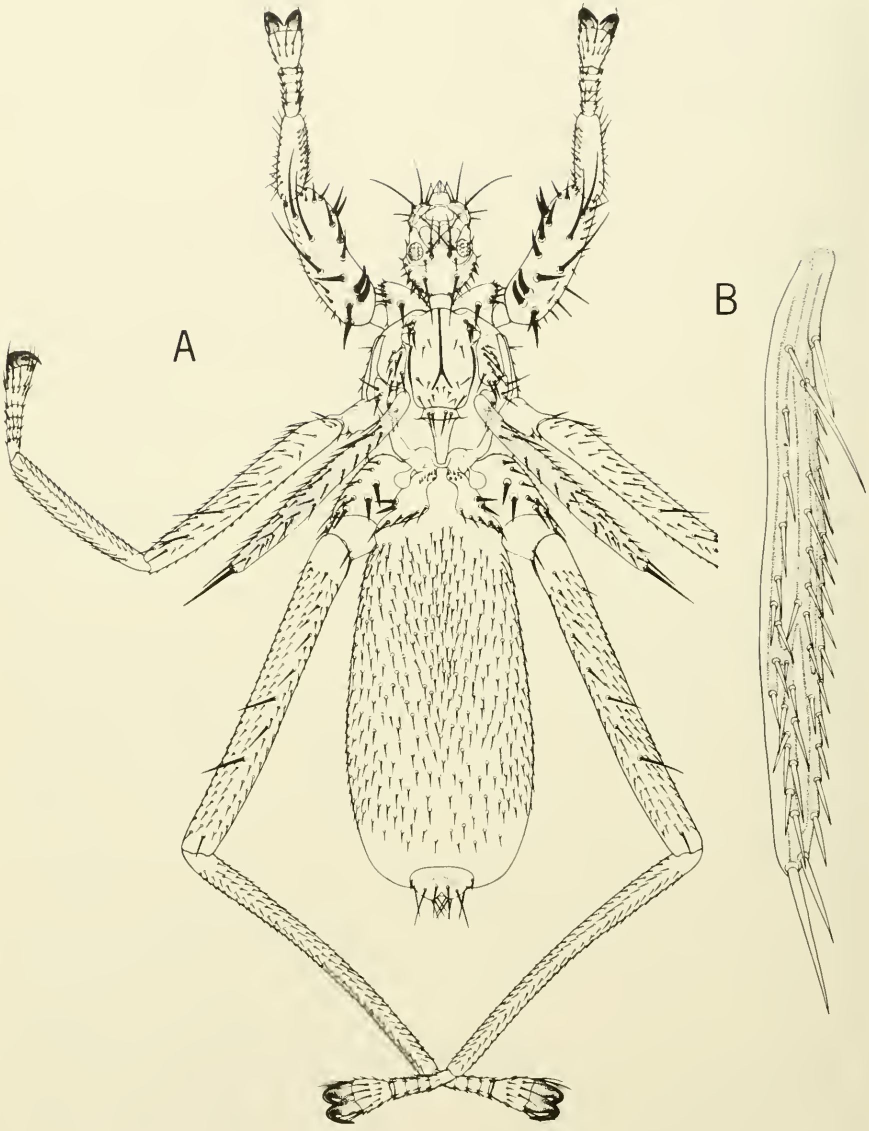

Fig. 36. *Neotrichobius stenopterus* Wenzel and Aitken, female: A, dorsal view and B, wing. From Wenzel et al. (1966).

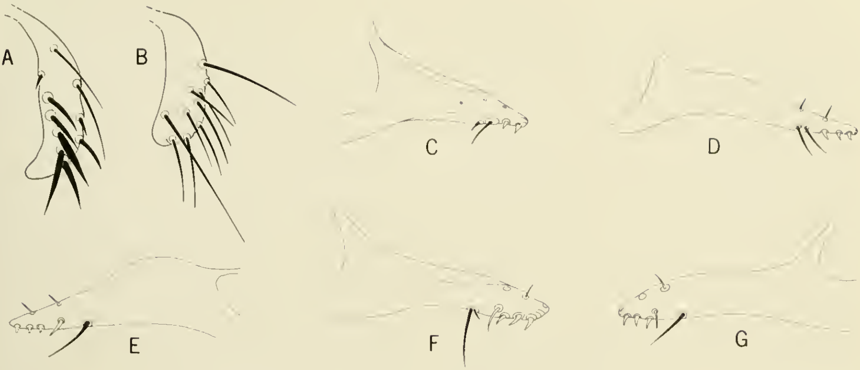

Fig. 37. A-B. left ventroapical margin of tergus 9: A, *Paratrichobius dunni* (Curran); B, *Paratrichobius longicrus* Ribeiro. C-G, male postgonites of species of *Neotrichobius*: C, *Neotrichobius ectophyllae*, new species (SVP 19282); D, *Neotrichobius stenopterus* Wenzel and Aitken (Panama, ex *Artibeus cinereus*, Tipton-Handley 11239); E, *Neotrichobius bisetosus*, new species (Surinam, ex *Phyllostomus hastatus*, FMNH 93180); F-G, *Neotrichobius delicatus* Machado-Allison (SVP 31945). A-B from Wenzel et al. (1966).

one side, between these and the median suture (1 in *stenopterus*). Scutum behind fork of median suture, with 4-6 (mean, 4.5) minute discal setae (6-9, mean 6.9 in *stenopterus*); a long macroseta on each side. Scutellum with 1 pair of macrosetae.

Wings. Vein 1 branched at about apical third (rather than beyond middle), its anterior branch joining the costa at about apical fourth (rather than apical third); spur of vein 2 beyond *r-m* usually distinctly longer than in *stenopterus*.

Legs. Hindfemora greatly elongated, nearly three times as long as thorax, measured from dorsal anterior margin to apex of postonotum.

Abdomen. Posterior margin of tergum 1+2 with a group of 8-10 long macrosetae on each side (7-9 in *stenopterus*), the two groups distinctly separated at middle. Male postgonites very similar to those of *stenopterus*, but not as slender and with only 2 rather than 3 denticles on ventral margin behind apex; ventral macroseta and accessory setae equal in length, indistinguishable from each other.

Type Data: Holotype male and allotype female ex *Artibeus fuliginosus* (SVP 19087), Venezuela, T. F. Amazonas, Río Orinoco, Tamatama, 135 m, 15-V-67. Paratypes—VENEZUELA. Bolívar: 1 male and 1 female ex *Artibeus fuliginosus*, 50 km SE El Manteco, Río Supamo, 150 m, 7-11-IV-66. T. F. Amazonas: 1 female ex 1 *Artibeus jamaicensis*, 6 males and 3 females ex *Artibeus fuliginosus*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-12-IV-67; 4 males and 6 females, same host, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 2-1–6-II-67; 2 males and 4 females, same host, 56 km NNW Esmeralda, Caño Essa, Belén, 150 m, 7-II-67; 8 males and 8 females, same host, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 2-I–12-II-67; 1 male, same host, 84 km SSE Esmeralda, 7 km up Río Mavaca, Boca Mavaca, 138 m, 3-III-67; 4 males, 6 females, and 1 sex undet., same host, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 30-V–1-VI-67; 2 males and 1 female, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 14-VII-67; 2 males and 1 female, same host and locality data as the holotype but 25-IV–15-V-67.

Other Material Examined

A paratype of *Neotrichobius stenopterus* Wenzel and Aitken (loc. cit.) ex *Phyllostomus hastatus* (Surinam) which proved to be *N. bisetosus* n. sp.

Measurements

	Males	Females (Allotype)
BL	1.52-1.88	1.95
TL	0.46-0.52	0.52
FL	0.94-1.00	1.03

Neotrichobius delicatus (Machado-Allison)

(Fig. 37F, G)

Megistopoda delicatus Machado-Allison, 1966: 76, Fig. 8-11

Neotrichobius stenopterus Wenzel and Aitken, 1966:539, Fig. 97-99 (part, Panamanian records ex *Vampyressa pusilla*)

Neotrichobius delicatus Machado-Allison, Wenzel, 1970:100.9 (new comb.)

This species was taken from a number of hosts, and from the data one suspects that the series recorded here represents several entities. Measurements of thorax and hindfemora of specimens from the various hosts show that those from *Vampyressa pusilla*, the type host of *delicatus*, have shorter legs and thorax, on the average, than do those from *Artibeus cinereus*, *Rhinophylla pumilio*, and *Artibeus* sp. A. This is evident even considering the small samples measured (8-10 specimens each). The mean length of the thorax of specimens from the last three hosts ranges from 0.48-0.50 mm., but in those from *V. pusilla* it is only 0.43 mm. On the other hand, the mean length of the hindfemora is 0.88 mm. for specimens from *pusilla*, 0.96 mm. for those from *Artibeus* sp. A, 0.98 mm. for those from *R. pumilio*, and 1.05 mm. for those from *A. cinereus*.

While these samples are very small, it is clear that populations from the various hosts do differ. Measurements of the two specimens from *Uroderma bilobatum* and *Vampyrops helleri* fall within the size classes of specimens from *V. pusilla*. I have been unable to detect any differences in chaetotaxy, wing venation, or structure of the male postgonites between specimens from the various hosts.

I have listed as *N. delicatus* only those specimens that were collected from the type host, *Vampyressa pusilla*. Other specimens are listed under *Neotrichobius* species (*delicatus* complex).

Venezuelan Survey Records (22 males, 13 females, 1 sex undet. ex 25 *Vampyressa pusilla*)

BARINAS: 4 males and 2 females, 2 km SW Altamira, Altamira, 609-619 m, 1-5-I-68; 2 males and 1 sex undet., Altamira, 794 m, 21-XII-67–11-I-68.

CARABOBO: 9 males and 6 females, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 27-XI–1-XII-67; 4 males and 5 females, 9 km NE Montalbán, Cumbre Canoabo, Montalbán, 727-773 m, 1-XI-67.

YARACUY: 3 males, 20 km NW San Felipe, Minas de Aroa, 395-400 m, 9-22-XII-67.

Other Material Examined

Two Panamanian paratypes (Wenzel and Aitken, loc. cit., p. 540) of *Neotrichobius stenopterus* from *Vampyressa pusilla* that were proved to be *N.* "*delicatus*."

Neotrichobius species (*delicatus* complex)

Neotrichobius stenopterus Wenzel and Aitken, 1966:539 (part, Trinidad record ex *Artibeus cinereus*)

Venezuelan Survey Records (85 males, 43 females, 4 sex undet.)

APURE: 9 males and 2 females ex *Artibeus cinereus*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 17-I–5-II-68.

BARINAS: 2 males ex *Artibeus cinereus*, 1 female ex 1 *Vampyrops helleri*, 2 km SW Altamira, Altamira, 609-619 m, 1-5-I-68.

BOLÍVAR: 1 male, 1 female, and 1 sex undet. ex *Rhinophylla pumilio*, 1 male and 2 females ex *Artibeus cinereus*, 150 m, 8-25-VI-66; 14 males and 6 females, same host, 4 males and 5 females ex *Rhinophylla pumilio*, 85 km SSE El Dorado, Km 125, 889-1,032 m, 9-19-V-66; 1 male, same host, 50 km SE El Manteco, Río Supamo, 150 m, 10-IV-66; 1 female ex *Artibeus cinereus*, 20 km W La Paragua, Hato San José, 324 m, 20-III-67; 1 male and 1 female, same host, 23 km NE Icabarú, El Pauji, Icabarú, 824 m, 27-IV-68; 1 male, same host, 45 km NE Icabarú, Santa Lucia de Surukun, Icabarú, 851 m, 2-V-68.

CARABOBO: 20 males and 6 females ex *Artibeus cinereus*, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 27-XI–1-XII-67; 1 male and 1 female, same host, 9 km NE Montalbán, Cumbre Canoabo, Montalbán, 727-773 m, 1-XI-67.

DTO. FEDERAL: 1 male ex *Artibeus cinereus*, 4 km NNW Caracas, Los Venados, 1,524 m, 25-VII-65; 1 male and 2 females, same host, 6 km NNW Caracas, nr. Boca Tigre, Pico Ávila, 1,982-2,119 m, 24-30-VIII-65.

FALCÓN: 1 female ex *Artibeus cinereus*, 16 km ENE Mirimire, nr. La Pastora, 70 m, 30-XI-67; 1 male, same host, 80 km NW Carora, Río Socopito, 480 m, 21-V-68; 1 male and 1 female, same host, 19 km NW Urama, Km 40, Urama, 25 m, 13-X-65.

GUÁRICO: 2 males ex *Artibeus cinereus*, 10 km NE Altagracia, Hda. Elvira, 630 m, 16-IX-66.

MIRANDA: 1 male ex *Artibeus cinereus*, 7 km N Río Chico, nr. Paparo, 1 m, 15-XI-66; 3 males and 4 females, same host, 5 km NNW Guarenas Curupao, 1,160-1,180 m, 7-13-X-66.

SUCRE: 1 male ex *Artibeus cinereus*, 9 km NE Güiria, Ensenada Cauranta, 1 m, 5-VI-67; 2 males, 2 females, and 1 sex undet., same host, 26 km ESE Carúpano, Manacal, 175-315 m, 18-31-VII-67.

T. F. AMAZONAS: 1 female ex *Artibeus cinereus*, 3 males and 1 female ex *Rhinophylla pumilio*, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 29-V–2-VI-67; 3 males and 1 female, same host, 1 male ex *Artibeus* sp. A, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 4-9-X-67; 1 female ex 1 *Uroderma magnirostrum*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 12-VII-67; 2 males ex *Artibeus cinereus*, Caño Culebra, 50 km NNW Esmeralda, Cerro Duida, 800 m, 19-1-67; 1 female ex 1 *Artibeus jamaicensis*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 4-IV-67; 1 male ex *Artibeus* sp. A, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 3-1-67; 5 males and 1 female, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 13-IV-67.

ZULIA: 1 male ex 1 *Uroderma bilobatum*, 1 male and 1 sex undet. ex *Artibeus cinereus*, 63 km WNW Encontrados La Rinconada, El Rosario, 125 m, 28-29-II-68; 1 female, same host, 48 km WNW Encontrados, El Rosario, 54 m, 25-II-68.

OTHER MATERIAL EXAMINED

The female paratype of *Neotrichobius stenopterus* Wenzel and Aitken (loc. cit.) ex *Artibeus cinereus*, Trinidad, which proved to be "*delicatus*."

Neotrichobius ectophyllae, new species

(Fig. 37C)

Similar to *Neotrichobius delicatus* in wing venation, in possessing relatively short hindlegs, and in that the two posterior spinelike setae on the inner dorsal edge of the profemur, opposite the two curved, very strong submarginal spines on inner face, are very unlike the more distal spinelike setae of the diagonal row; both of these basal setae are conspicuously weaker in *ectophyllae*, while in *delicatus* the basal one is stronger and longer than the distal spines, the next one shorter and weak. In *N. bisetosus* n. sp. and *N. stenopterus*, the two basal setae of the dorsal diagonal row are heavy spines like the distal ones. *Neotrichobius ectophyllae* differs conspicuously from *delicatus*, in that the row of setae along the posterior margin of tergum 1+2 is single and clearly interrupted at middle; this row is complete and double at middle in *delicatus*. The supra-anal plate of the female has two discal microsetae, one on each side near margin. These are absent in all other species, though it was mistakenly figured as present in *stenopterus* (Wenzel and Aitken. 1966:539).

DESCRIPTION

The description of *Neotrichobius stenopterus* Wenzel and Aitken (loc. cit.) applies equally well to *ectophyllae* n. sp. except for the following distinctive characters.

Head. Theca with arcuate but subparallel sides, longer than broad; distal margin with four subequal, strong, but not spinelike setae on distal margin, the outer two sometimes slightly shorter; ventral surface with a transverse row of four shorter, finer, subequal setae at apical third and another row of four at about basal third (in *stenopterus* the outer distal setae are spinelike, heavier than inner pair, and there is a pair of similar spinelike setae one on each side posterior to these, with a pair of fine setae between and slightly posterior to them, and a transverse row of four near base).

Thorax. Prescutum near anterior margin with the usual short seta on each side of median suture, and three strong, fairly long "spiracular" setae on each side medial to the spiracle; medial to these a shorter, finer seta, and posterior to this a strong, long seta similar to those of the spiracular group (in *stenopterus* there are three or four strong spiraculars, often much longer and spinelike, and the median setae are conspicuously weaker and usually much shorter than the spiraculars); posteriorly, on each side of fork of median suture are from two to three (rarely one) short, finer setae, and along lateral margin, in tandem, a pair of strong, fairly long setae similar to the spiraculars. Scutum with seven to nine short, fine, discal setae and on each side in posterolateral angles are one strong macroseta and sometimes one short fine seta (in *stenopterus*, there is only one minute seta lateral to fork of median suture, and/or two setae along each lateral margin, one of these stronger than the other, but conspicuously shorter and weaker than the spiraculars). Scutum with six to nine fine, short setae and the usual strong marginal macroseta. Scutellum with four setae, the median pair being macrosetae about twice as long as the outer pair.

Wings. Of about the same relative size as in *stenopterus* but first longitudinal vein branched slightly before midlength, the anterior branch joining the costa a little beyond midlength, the posterior branch joining costa before apex; *r-m* a little beyond midlength of wing, the second vein joining costa at apex.

Legs. Profemora with chaetotaxy as in *stenopterus* but inner dorsal margin (dorsal to the two curved submarginal spines on inner face) with a strong basal macroseta, followed by two shorter, much weaker setae, and distal to these a row of five stout spines, as in *delicatus*. Mid- and hindlegs shorter, as in *stenopterus*, hindfemora almost exactly twice as long as thorax (measured from anterior margin to tip of postnotum).

Abdomen. Sternum 2, distal to the basal group of spinelike setae, with a triangular area of 13-15 much finer setae similar to those of the ventral connexivum; posterior margin with 12-14 setae, these usually consisting of a median pair similar to the connexival setae, a slender macroseta on each side, and lateral to these about 4-5 shorter setae, these sometimes spinelike. FEMALE. Tergum 7 absent as usual. Supra-anal plate with a minute seta at about midlength on each side near margin. Seventh sternites each with about 5 very short setae and 2 macrosetae. MALE. Sternum 5 with discal setae like those of adjacent connexivum but generally slightly shorter; setae of apical margin abraded in the type, except on far right side where there is 1 macroseta (longer than sternum) and lateral to this 2 shorter setae. Sternum 7+8 with a pair of dorsal macrosetae and on each lateral margin 1 short, stout seta. Each side of tergum 9 with a strong dorsolateral macroseta, 1 distal macroseta, 1 shorter but strong basal seta along each inner margin, and 2 shorter setae near ventrolateral margin.

Postgonites rather short and strongly tapered, the right one a little heavier; ventral margin of each with 2 denticles between apex and ventral macroseta, this inserted far distad, the one on left postgonite somewhat more so than that on the right; accessory seta about half as long as, and inserted somewhat below and anterior to, the macroseta; other setae apparently broken off in the unique male.

MEASUREMENTS

	Males	Females
BL	1.52	1.58-1.86
TL	0.44	0.43-0.47
FL	0.86	0.86-0.91

TYPE DATA: Holotype male ex *Ectophylla macconelli* (SVP 19282) and allotype female, same host (SVP 19436), and 4 female paratypes, same host, Venezuela, T. F. Amazonas, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 29-V–1-VI-67.

Genus *Megistopoda* Macquart

Megistopoda Macquart, 1852:332.–Maa, 1965: 385.–Wenzel, Tipton, and Kiewlicz, 1966: 541.–Machado-Allison, 1966:69

TYPE SPECIES: *Megistopoda pilatei* Macquart, 1852:332.

Pterellipsis Coquillet, 1899-333.–Jobling, 1936: 357.

TYPE SPECIES: *Pterellipsis aranea* Coquillett, 1899:333.

In addition to the large series (529 specimens) of *Megistopoda aranea* that are treated below, the collections made by the survey teams included 1,358 specimens of the *Megistopoda proxima* complex. These included 971 ex 509 *Sturnira lilium* from 65 localities in 15 states; 215 ex 123 *S. ludovici* from 17 localities in 8 states; 135 ex 77 *S. tildae*, from 8 localities in Bolívar and T. F. Amazonas; and 19 ex 15 *S. erythromos*, from 2 localities in Monagas and Dto. Federal. The remaining 18 specimens are from 11 different host species, mostly fruit-eating bats, from various localities.

The specimens from *S. tildae* appear to represent a new species of the *proxima* complex. In reviewing the material from Venezuela, it became evident that the taxonomy of this complex cannot be resolved without undertaking a revision of all available material. Since this is beyond the scope of the present paper, I have deferred it for a later report.

Megistopoda aranea (Coquillett)

Pterellipsis aranea Coquillett, 1899:344.–Wenzel, Tipton, and Kiewlicz, 1966:542, Fig. 100A, D.–Machado-Allison, 1966:70.

Megistopoda desiderata Speiser, 1900:57, Pl. 3, Fig. 6-8.

Megistopoda pilatei Macquart, 1852:332.–Wenzel, Tipton, and Kiewlicz, 1966:541-542.

Megistopoda aranea is easily separated from members of the *M. proxima* complex as follows:

Wings narrow, with only 4 longitudinal veins. Legs very long: hindfemora as long as or nearly as long as the entire body. Prescutum with very weak setae along median suture; each lateral margin, along notopleural suture, with one or two longer setae .... *Megistopoda aranea* Coquillett

Wings broader, venation as in Fig. 38E. Legs shorter, hindfemora only a little longer than abdomen. Prescutum with short but strong setae along median suture; four strong setae usually present along each margin .... *Megistopoda proxima* complex

Venezuelan Survey Records (337 males, 206 females, and 3 sex undet.)

To briefly summarize, the survey teams collected this fly at 62 localities in 16 states as follows: Apure (2 localities, 24-76 m); Barinas (1 locality, 609-611 m); Bolívar (3 localities, 150-324 m); Carabobo (4 localities, 598-1,007 m); Dto. Federal (4 localities, 398-2,050 m); Falcón (7 localities, 2-480 m); Guárico (5 localities, 100-630 m); Lara (1 locality, 528 m); Miranda (5 localities, 1-1,180 m); Monagas (1 locality, 1,170 m); Nueva Esparta (2 localities, 38-53 m); Sucre (6 localities, 1,300 m); T. F. Amazonas (9 localities, 119-1,524 m); Trujillo (4 localities, 28-900 m); Yaracuy (1 locality, 395 m); Zulia (8 localities, 24-1,135 m).

Other Venezuelan Material Examined

ARAGUA: 3 sex undet. ex 1 *Artibeus jamaicensis*, Rancho Grande Biol. Sta., 30-III-60, C. O. Handley, Jr.

BOLÍVAR: 1 female ex *Artibeus lituratus*, 38 km S El Dorado, 2-VIII-62, J. Ojasti.

MIRANDA: 5 males and 1 sex undet. ex *Artibeus jamaicensis*, El Cafetal, 8-IV-62, J. Ojasti.

Host Associations

Of 545 specimens of *Megistopoda aranea* collected by the survey teams, 530 (97 percent) were from 326 *Artibeus jamaicensis*. The remaining 16 (3 percent) were from 15 bats from 11 different species.

Megistopoda proxima (Séguy)
(Fig. 38)

Pterellipsis proxima Séguy, 1926:194, Fig. 2-6.

Our interpretation (Wenzel et al., 1966:543) of *Megistopoda proxima* (Séguy) was based on Séguy's (loc. cit.) illustrations which showed prominent denticles on the ventral margins of the male postgonites. Through the kindness of Dr. Loïc Matile of the Paris Museum, I have been able to reexamine the type of *proxima*. Unfortunately, the type slide was broken in half (in shipment), and the tips of the postgonites were broken off. Nevertheless, it is clear that their ventral margins are curved, as in *theodori*, not straight as in the species we recorded as *proxima*. Further, it is now evident that minute denticles are present in "*theodori*" though they are often lost when specimens are processed in caustic for mounting on slides. *Megistopoda theodori* Wenzel could be a synonym of *proxima*, but a decision is deferred pending further study. The species treated by us (op. cit., p. 543, Fig. 100C, 101) as *M. proxima* is new and will be described later.

Genus *Mastoptera* Wenzel

Mastoptera Wenzel, 1966:512

Type Species: *Aspidoptera minuta* Lima, 1921:21

In these tiny mitelike flies, unlike any other Streblidae, the dorsal abdominal connexivum is lightly sclerotized, especially between the lateral lobes of tergum 1+2. This is almost impossible to detect in cleared specimens. Occasionally, it is as strongly sclerotized and pigmented basally as the lateral lobes of tergum 1+2, and the sclerotized area is separated from the lateral lobes by a membranous "suture." The degree of sclerotization seems to vary according to species.

Key to Described Species of *Mastoptera*

1. Males 2
   Females 3

2. Dorsolateral connexivum usually with 1 or 2 setae behind lateral lobes of tergum 1+2, these longer and much heavier than the others. Setae along posterior margin of sternum 2 scarcely, if at all, longer than the ventral connexival setae posterior to them .... *guimaraesi* Wenzel
   Dorsolateral connexivum never with 1 or 2 conspicuously stronger setae behind lateral lobes of tergum 1+2. Setae along posterior margin of sternum 2 distinctly longer than the ventral connexival setae posterior to them .... *minuta* complex

3. Lateral lobes of tergum 1+2 unusually long and narrow, apical half with subparallel sides, about as wide as hind tibiae; connexivum behind, and usually slightly medial to apices of lateral lobes, with 1 or 2 setae which are longer and much stronger (sometimes macrosetae) than surrounding connexival setae. Sternum 2 nearly as long as venter of thorax, the median discal setose area narrowing from base to apical margin (where it occupies ca. midthird of width); lateral to this area there are only marginal setae, there being no submarginal discal setae anterior to them. Seventh

sternites largely bare except for macrosetae along base and short setae along inner margin to apex .... *guimaraesi* Wenzel

Lateral lobes of tergum 1+2 much shorter and broader, sides rather evenly converging to apex. Sternum 2 only slightly longer than metasternum, the median setose area widening apically and extending laterally to the posterolateral angles as an irregular single to double row, anterior to the marginal setae. Seventh sternites setose throughout, without a conspicuous nude area .... *minuta* complex

Mastoptera guimaraesi Wenzel

(Fig. 39, 40A)

Mastoptera guimaraesi Wenzel, 1966:514, Fig. 82C, 83, 84

Venezuelan Survey Records (40 males, 47 females, 1 sex undet.)

APURE: 10 males and 4 females ex *Phyllostomus hastatus*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 17-31-I-68.

BARINAS: 1 female ex *Phyllostomus hastatus*, 2 km SW Altamira, Altamira, 620 m, 26-XII-67; 1 male, same host, Altamira, 794 m, 10-I-68.

CARABOBO: 1 male and 5 females ex *Phyllostomus hastatus*, 6 km N Urama, Urama, 60 m, 17-III-66.

FALCÓN: 1 female ex *Phyllostomus hastatus*, 80 km NW Carora, Río Socopito, 480 m, 20-V-68.

TRUJILLO: 2 females ex *Phyllostomus hastatus*, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 5-IX–7-X-65; 1 male and 1 female, same host, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 22-X-65.

YARACUY: 2 males and 2 females ex *Phyllostomus hastatus*, 11 km NW Urama, El Central, Urama, 25 m, 14-III-66; 2 males and 3 females, same host, 13 km NW Urama, El Central, Urama, 25 m, 20-III-66.

ZULIA: 2 males and 3 females ex *Phyllostomus hastatus*, 33 km NW La Paz, nr. Cerro Azul, 75 m, 13-VI-68; 17 males, 14 females, and 1 sex undet., same host, 1 female ex *Phyllostomus discolor*, 39 km WNW Encontrados, El Rosario, 37 m, 31-III–1-IV-68; 1 female, same host, 45 km WNW Encontrados, El Rosario, 37 m, 31-III-68.

Host Associations

Of the 88 specimens of *Mastoptera guimaraesi* that were collected by the survey teams, 84 were from 23 *Phyllostomus hastatus*. Unfortunately, I do not have subspecies identifications of the survey specimen of the host bats. However, examination of the distribution of the subspecies of *Phyllostomus hastatus*, as given by Valdez (1970, unpubl. thesis) shows that most specimens of *M. guimaraesi* were collected in the area where the host subspecies *P. hastatus panamensis* occurs, in northwestern Venezuela. Specimens of *Mastoptera* from other areas of Venezuela, where *P. hastatus hastatus* occurs, are a different species belonging to the *minuta* complex, though both species of *Mastoptera* were collected in one area in Yaracuy (see below).

Mastoptera minuta (Lima)

(Fig. 40B)

Aspidoptera minuta Lima, 1921:21, Pl. 2, Fig. 2

Mastoptera minuta, Wenzel, Tipton, and Kiewlicz, 1966:515, Fig. 82B, 85 (part, records from *Tonatia silvicola*)

Through the kind help of Dr. Adriano L. Peracchi, of the Universidad Rurale, Campo Grande, G. G., Brazil, I was able to search for and examine Streblidae from the collection of da Costa Lima in the Universidad and the Instituto Oswaldo Cruz. No specimens of *minuta* were found. If still extant, the type is elsewhere. The host given for the type was *Tonatia silvicola*. While there is no assurance that this identification is correct, I regard specimens of *Mastoptera* taken from that host as being *Mastoptera minuta*. Specimens of "*minuta*" from other hosts are recorded under "*Mastoptera* species (*minuta* complex)" (q.v.).

Venezuelan Survey Records (26 males, 32 females, 2 sex undet. ex 23 *Tonatia silvicola*)

FALCÓN: 4 males and 2 females, 19 km NW Urama, Km 40, Urama, 25 m, 25-X–12-XI-65.

T. F. AMAZONAS: 2 males and 1 female, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 3-I-67; 14 males, 21 females, and 1 sex undet., 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 30-V–12-VI-67; 1 sex undet., 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 9-X-67; 2 females, 108 km, SSE Esmeralda, Río Mavaca, 140 m, 5-12-IV-67; 1 male, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 24-VII-67.

TRUJILLO: 4 males and 6 females, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 20-VIII–18-X-65.

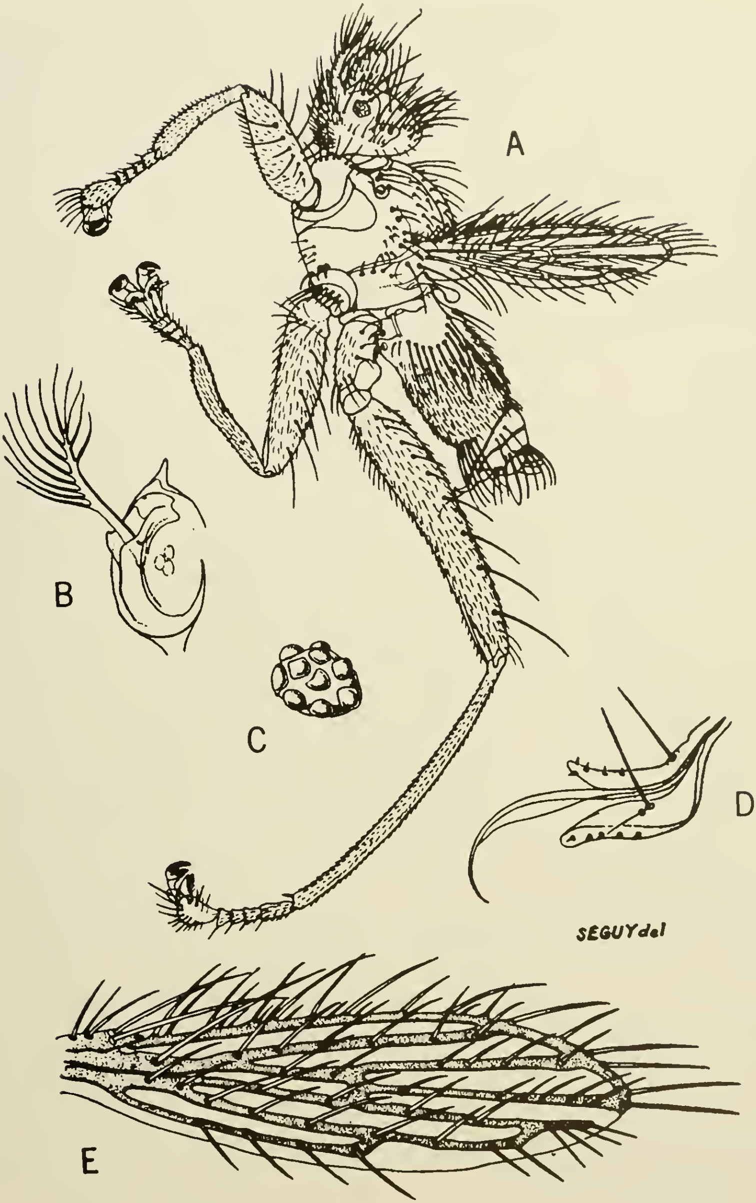

Fig. 38. *Megistopoda proxima* Séguy, male: A, lateral view; B, antenna; C, eye; D, male postgonites, spread out, ventral view; E, wing. From Séguy (1926).

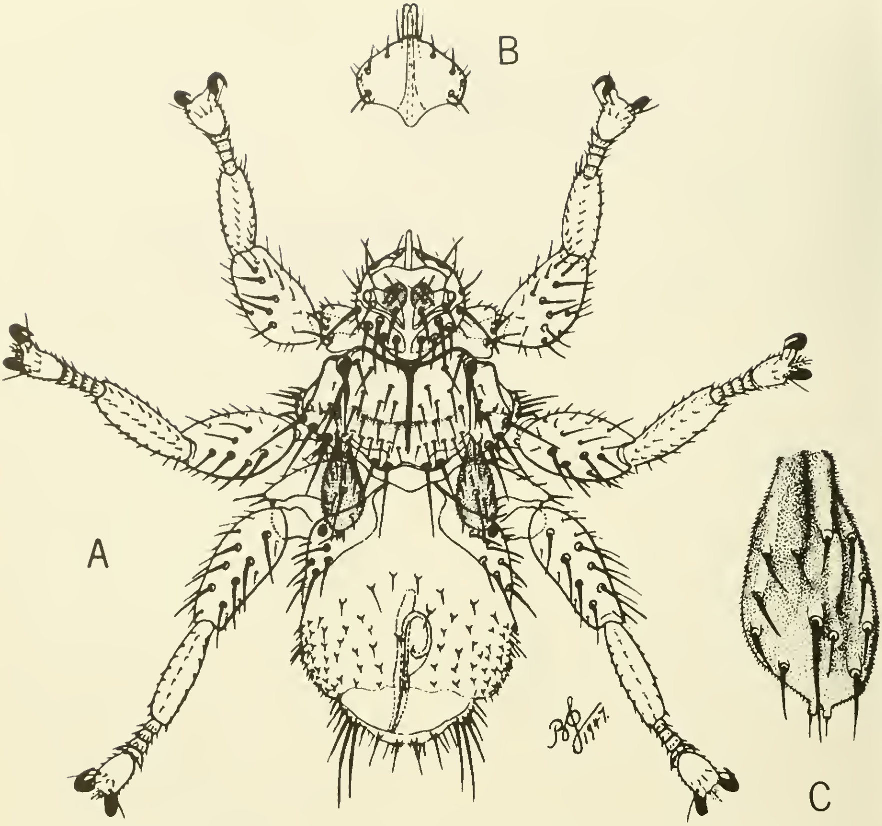

Fig. 39. *Mastoptera guimaraesi* Wenzel: A, male, dorsal view; B, labium; C, wing. From Jobling (1949; as *Aspidoptera minuta*).

ZULIA: 1 male, 60 km WNW Encontrados, Boca del Río de Oro, El Rosario, 73 m, 17-III-68.

Mastoptera species (*minuta* complex)

Specimens of the *minuta* complex from various hosts exhibit differences, often slight and overlapping, in the length and number of setae on various structures, in body measurements, and sometimes in the curvature of the male postgonites. However, the series presently available from some of the host species are not adequate for morphometric analysis of the entire complex.

Body measurements of specimens of *minuta* from *Phyllostomus hastatus* and *P. elongatus* that were taken in north central, eastern, and southern Venezuela clearly indicate that this population is distinct from any of those on species of *Tonatia*. I prefer not to name it at this time. However, if it is a distinct species, this explains the puzzling geographic and host distribution of the species of *Mastoptera* referred to by Wenzel et al. (op. cit., p. 518). It should be noted that a single specimen of this entity was taken from *P. hastatus* in Yaracuy (El Central), 11 km NW of Urama, where all other specimens taken from that host were *M. guimaraesi*. Distributional data for the species of *Strebla* that were taken from *P. hastatus*—as well as for species of *Noctiliostrebla*, *Paradyschiria*, and some other streblids—indicate that this is an area in which some parasite species that are characteris-

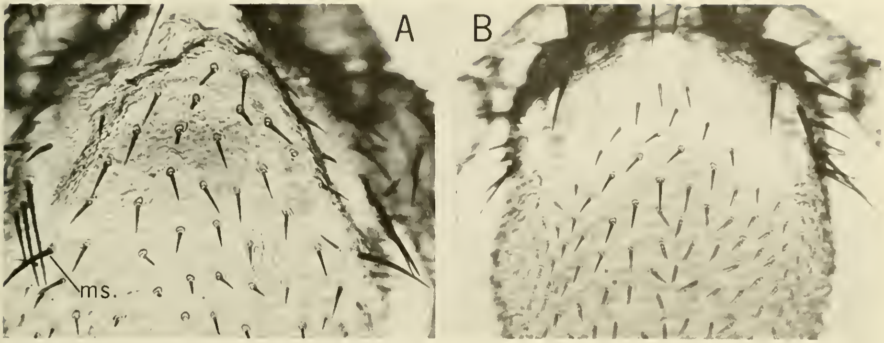

Fig. 40. A, *Mastoptera guimaraesi* Wenzel, and B, *Mastoptera minuta* (Lima); base of female abdomen, dorsal view. From Wenzel et al. (1966).

tic of different subspecies of the same host, or of allopatric host species, interdigitate or meet.

Venezuelan Survey Records (151 males, 149 females, 3 sex undet.)

T. F. AMAZONAS: 1 male and 1 female ex *Phyllostomus elongatus*, 2 males, 11 females, and 1 sex undet. ex *Phyllostomus hastatus*, 25 km S Pto. Ayacucho, Paria, Pto. Ayacucho, 114 m, 14-IX–5-X-67; 11 males and 12 females, same host, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 6-IX–10-X-67; 1 male ex *Tonatia brasiliensis*, 1 sex undet. ex *Tonatia silvicola*, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 8-X-67; 12 males and 5 females ex *Tonatia brasiliensis*, 1 male ex *Tonatia silvicola*, 3 males and 5 females ex 1 *Anoura* sp. A., 1 female ex *Artibeus fuliginosus*, 1 sex undet. ex *Artibeus lituratus*, 1 female ex *Artibeus jamaicensis*, 1 female ex *Phyllostomus elongatus*, 32 males and 32 females ex *Phyllostomus hastatus*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 5-28-VII-67; 15 males and 14 females, same host, 14 males and 21 females ex *Tonatia silvicola*, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 29-30-V-67; 1 male and 1 female ex *Phyllostomus hastatus*, 19 males and 12 females ex *Phyllostomus elongatus*, 12 males and 7 females ex 1 *Tonatia carrikeri*, 2 females ex *Tonatia silvicola*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 4-14-IV-67; 2 males and 1 female ex *Tonatia silvicola*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 3-I-67; 2 males and 3 females ex *Phyllostomus hastatus*, Río Orinoco, Tamatama, 135 m, 1-V-67.

TRUJILLO: 17 males and 12 females ex *Tonatia brasiliensis*, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 15-IX-65; 4 males and 6 females, ex *Tonatia silvicola*, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 20-VIII–18-X-65.

YARACUY: 1 male and 1 female ex *Tonatia brasiliensis*, 1 male ex *Phyllostomus hastatus*, 11 km NW Urama, El Central, Urama, 25 m, 14-22-III-66.

ZULIA: 1 male ex *Tonatia silvicola*, 60 km WNW Encontrados, Boca del Río de Oro, El Rosario, 73 m, 17-III-68.

Genus *Aspidoptera* Coquillett

Aspidoptera Coquillett, 1894:334
Type Species: *Aspidoptera busckii* Coquillett, 1894:335 (= *Lipoptena phyllostomatis* Perty)
Lepopteryx Speiser, 1900:53
Type Species: *Lipoptena phyllostomatis* Perty, 1833:190

Key to Species of *Aspidoptera*

1. Upper portion of mesepisternum with 3-4 longitudinal rows of long setae 2
Upper portion of mesepisternum (viewed from above) with 1-2 rows of longer setae similar to those of prescutum, but the outer (morphologically, lower) setae conspicuously shorter .... *phyllostomatis* (Perty)

2. Male postgonites bent (Fig. 42B) but not falciform .... *delatorrei* Wenzel
Male postgonites strongly bent, falciform (Fig. 42A) .... *falcata* n. sp.

Aspidoptera delatorrei Wenzel

(Fig. 42B)

Aspidoptera delatorrei Wenzel, 1966:557, Fig. 104B, D.

Venezuelan Survey Records (7 males, 3 females ex 3 *Sturnira lilium*)

ZULIA: 3 males and 2 females, 60 km WNW Encontrados, Boca del Río de Oro, El Rosario, 73 m, 17-III-68; 3 males and 1 female, 21 km SW Machiques, Kasmera, 270 m, 17-IV-68; 1 male, 19 km WSW Machiques, Novito, 1,135 m, 29-IV-68.

Aspidoptera falcata, new species

(Fig. 42A)

Aspidoptera falcata is extraordinarily similar to *delatorrei* Wenzel, and, insofar as I have been able to determine, it differs invariably from that species only in its strongly falcate male postgonites. Females of the two species can be identified with some assurance only by association with the males. Females of *delatorrei* more frequently possess six or seven "discal" setae (in addition to the apical macrosetae) than they do four, on the supra-anal plate. The converse is true of females of *falcata*. Often only a single seta is present on each side, especially in *falcata*, and in this respect such specimens resemble *A. phyllostomatis*.

Description

With the characters of *Aspidoptera delatorrei* Wenzel, including the several longitudinal rows of long setae on upper portion of mesepisternum. Female. Supra-anal plate occasionally with six, sometimes four discal setae, but commonly with only two (a single seta on each side), in addition to the distal macrosetae. Male. Postgonites strongly falcate, their distal portion bent at right angles to the long axis of the hypandrium.

Measurements

	Males	Females
BL	1.56-1.87	1.46-2.30
TL	0.47-0.53	0.49-0.55
WL	0.28-0.33	0.31-0.34
WW	0.20-0.23	0.22-0.26

Type Data: Holotype male and allotype female ex *Sturnira lilium* (SVP 226), Venezuela, Dto. Federal, 4 km NNW Caracas, Los Venados, 1,559 m, 25-VII-65. Paratypes (260 males, 258 females, 5 sex undet. ex 310 *Sturnira lilium*)—VENEZUELA. Apure: 27 males, 22 females, and 1 sex undet., 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 17-I–2-II-68. Barinas: 7 males and 10 females, 2 km SW Altamira, Altamira, 611-620 m, 27-XII-67–4-I-68; 2 males and 1 female, 7 km NNE Altamira, Altamira, 1,070 m, 26-XII-67; 7 males and 6 females, Altamira, 794 m, 19-XII-67–9-I-68. Bolívar: 5 males and 7 females, 56 km SE El Dorado, Km 67, El Manaco, 150 m, 16-VI-66; 17 males and 14 females, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 8-25-VI-66; 1 female, 67 km SSE El Dorado, nr. Río Danta, El Manaco, 150 m, 24-VI-66; 7 males and 3 females, 45 km NE Icabarú, Santa Lucia de Surukun, Icabarú, 851 m, 29-IV–2-V-68; 3 males and 3 females, 85 km SSE El Dorado, Km 125, 1,032 m, 9-V-66; 4 males and 6 females, 28 km SE El Manteco, Los Patos, 150 m, 11-IV-66; 1 male and 2 females, 50 km SE El Manteco, Río Supamo, 150 m, 10-IV-66. Carabobo: 1 male and 1 female, 2 km SE Montalbán, Potrerito, Montalbán, 598 m, 31-X–1-XI-67; 2 females, 3 km SW Montalbán, Hda. La Canada, Montalbán, 618 m, 22-XI-67; 3 males, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 28-XI-67; 1 female, 10 km NW Urama, El Central, Urama, 25 m, 15-XI-65. Dto. Federal: 3 males, 1 female, and 1 sex undet., nr. El Limón, 48 km W Caracas, Hda. Carapiche, 398 m, 19-21-VIII-66; 28 males and 36 females, same locality as holotype and allotype, except for 1,400-1,560 m, 30-VI–2-VIII-65. Falcón: 1 female, 84 km NW Carora, Cerro Socopito, 1,260 m, 17-V-68; 2 males and 4 females, 80 km NW Carora, Río Socopo, 470-480 m, 21-29-V-68; 21 males and 39 females, 19 km NW Urama, km 40, Urama, 25 m, 13-X-65–6-III-66. Guárico: 1 male, 14 km SE Calabozo, nr. Río Orituco, Estacion Biologicas de los Llanos, 100 m, 21-VIII-68; 1 male, 9 km SE Calabozo, Estacion Biologicas de los Llanos, 100 m, 19-VIII-68; 4 males and 2 females, 10 km NE Altagracia, Hda. Elvira, 630 m, 16-IX-66; 4 males and 2 females, 10 km N Altagracia, Río Orituco, 470 m, 20-IX-66. Lara: 1 male, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 528 m, 14-VII-68. Miranda: 1 male and 1 female, 1 km S Río Chico, 1 m, 25-X–2-XI-66; 3 males and 1 female, Birongo, 60 m, 22-I-68; 2 males, 5 km NNW Guarenas, Curupao, 1,120-1,180 m, 13-14-X-66; 6 males and 3 females, 21 km NW Altagracia, Parque Nac. Guatopo, 630 m, 22-IX–2-X-66. Monagas: 2 males and 2 females, 3 km NW Caripe, nr. San Agustín, 1,165-1,275 m, 4-11-VII-67; 1 male and 2 females, 5 km NW Caripe, San Agustín, 1,160-1,170 m, 3-5-VII-67. Sucre:

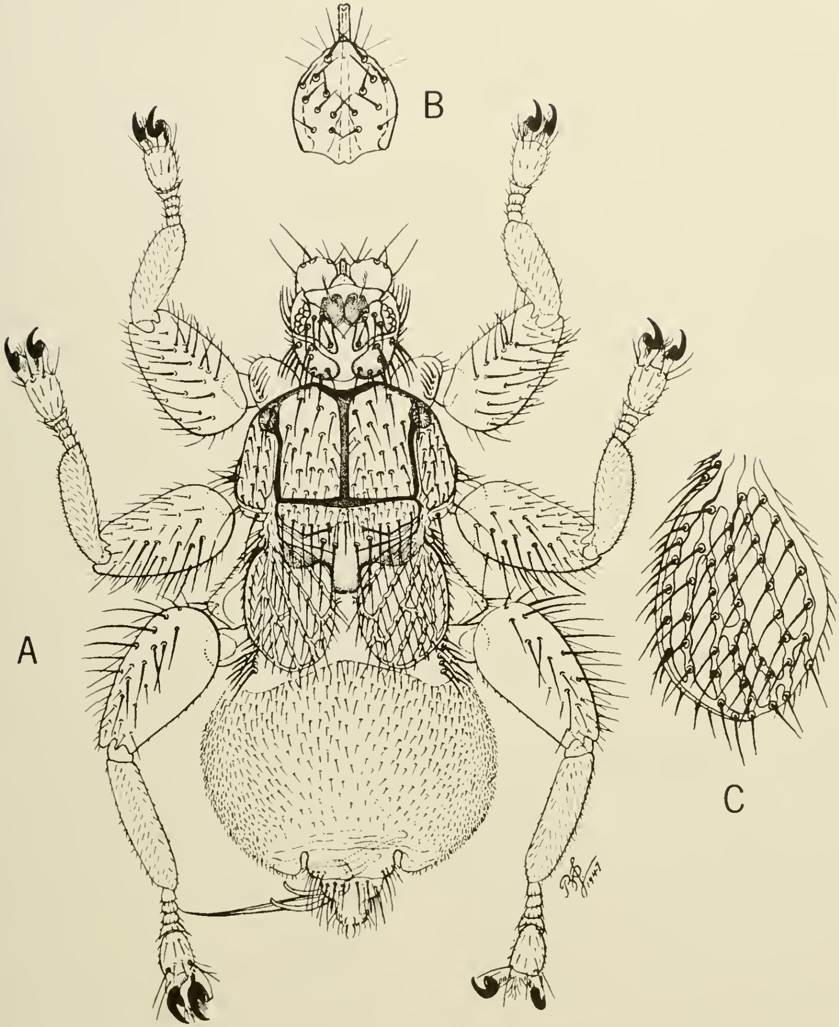

Fig. 41. *Aspidoptera phyllostomatis* (Perty): A, male, dorsal view; B, labium; C, wing. From Jobling (1949).

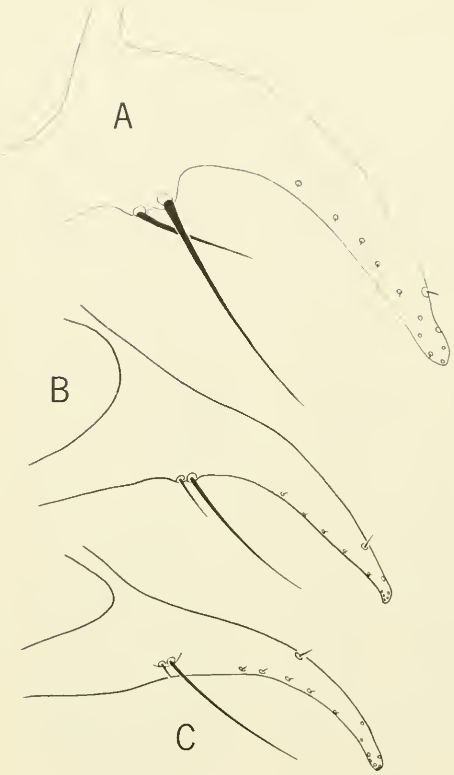

Fig. 42. Male Postgonites: A, *Aspidoptera falcata*, new species (SVP 2184); B, *Aspidoptera delatorrei* Wenzel; C, *Aspidoptera phyllostomatis* (Perty). B-C from Wenzel et al. (1966).

1 male and 1 female, 16 km E Cumaná, 1 m, 7-XII-66; 1 male and 2 females, 21 km E Cumaná, 1-15 m, 14-23-XII-66; 6 males and 2 females, 11 km NE Güiria, Ensenada Cauranta, 75 m, 10-VI-67; 6 males and 1 female, 12 km NE Güiria, Ensenada Cauranta, 90 m, 17-19-VI-67; 5 males and 8 females, 9 km NE Güiria, Ensenada Cauranta, 1-4 m, 4-15-VI-67; 1 female, 26 km ESE Carúpano, Manacal, 175 m, 27-VII-67. T. F. Amazonas: 1 female, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 2-11-67; 1 male and 1 female, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 2-10-II-67; 14 males and 7 females, 25 km S Pto. Ayacucho, Paria, Pto. Ayacucho, 114 m, 13-IX–6-X-67; 2 males, 28 km S Pto. Ayacucho, Guayabal, Pto. Ayacucho, 135 m, 7-X-67; 3 males, 30 km S Pto. Ayacucho, Coromoto, Pto. Ayacucho, 126 m, 8-9-X-67; 4 males and 4 females, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 6-7-IX-67; 10 males and 7 females, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 6-24-VII-67. Trujillo: 2 males and 8 females, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 3-IX–7-X-65; 1 male and 2 females, 23 km N Valera, nr. Agua Viva, Valera, 164 m, 17-IX-65; 1 male and 4 females, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 15-VIII-18-X-65. Yaracuy: 5 males and 6 females, 10 km NW Urama, El Central, Urama, 25 m, 8-14-III-66; 1 female, 11 km NW Urama, El Central, Urama, 25 m, 14-III-66. Zulia: 7 males and 5 females, 39 km WNW Encontrados, El Rosario, 37 m, 31-III–1-IV-68; 5 males, 7 females, and 1 sex undet., 42 km WNW Encontrados, El Rosario, 24 m, 3-5-III-68; 22 males, 16 females, and 2 sex undet., 60 km WNW Encontrados, Boca del Río de Oro, El Rosario, 73 m, 17-20-III-68; 1 female, 19 km WSW Machiques, Novito, 1,135 m, 5-V-68.

Other Venezuelan Survey Material Examined (130 males, 115 females, and 1 sex undet.)

APURE: 1 male ex 1 *Carollia perspicillata*, 1 female ex *Sturnira ludovici*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 17-I–2-II-68.

BARINAS: 5 males and 10 females ex *Sturnira ludovici*, 2 km SW Altamira, Altamira, 611-620 m, 26-XII-67–3-I-68; 2 males and 1 female, same host, Altamira, 794 m, 21-XII-67–10-I-68.

BOLÍVAR: 1 male ex 1 *Artibeus cinereus*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 25-VI-66; 6 males ex *Sturnira tildae*, 45 km NE Icabarú, Santa Lucia de Surukun, Icabarú, 851 m, 30-IV–2-V-68; 3 males and 3 females, same host, 85 km SSE El Dorado, Km 125, 1,032-1,165 m, 9-23-V-66.

CARABOBO: 1 female ex *Sturnira ludovici*, 13.5 km NE Montalbán, La Voluntad, Montalbán, 1,007 m, 2-XI-67; 1 male, same host, 2 km SE Montalbán, Potrerito, Montalbán, 598 m, 31-X-67; 4 males and 3 females, same host, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 29-XI-67.

DTO. FEDERAL: 1 male ex 1 *Vampyrops umbratus*, 5 km NW Caracas, nr. Clavelitos, Boca Tigre Valley, 1,394 m, 27-VIII-65; 1 female ex 1 *Sphaeronycteris toxophyllum*, 2 males ex

Sturnira ludovici, 4 km NNW Caracas, Los Venados, 1,400-1,507 m, 23-VII–2-VIII-65; 1 male, same host, nr. El Limón, 48 km W Caracas, Hda. Carapiche, 398 m, 20-VIII-66.

GUÁRICO: 6 males and 9 females ex *Sturnira ludovici*, 10 km NE Altagracia, Hda. Elvira, 630 m, 16-IX-66.

MIRANDA: 4 males and 2 females ex *Sturnira ludovici*, Birongo, 60 m, 22-I-68; 6 males and 6 females, same host, 5 km NNW Guarenas, Curupao, 1,160 m, 5-13-X-66; 15 males and 10 females, same host, 21 km NW Altagracia, Parque Nac. Guatopo, 630 m, 22-24-IX-66; 1 female, same host, 5 km NNE Caracas, nr. Hotel Humboldt, Pico Ávila, 2,124 m, 12-IX-65.

MONAGAS: 1 male and 1 female ex *Sturnira ludovici*, 3 km NW Caripe, nr. San Agustín, 1,345 m, 11-VII-67.

SUCRE: 1 female ex *Sturnira tildae*, 12 km NE Güiria, Ensenada Cauranta, 90 m, 17-VI-67; 1 female ex *Artibeus jamaicensis*, 21 km E Cumaná, 1 m, 10-XII-66.

T. F. AMAZONAS: 1 female ex *Artibeus jamaicensis*, 1 male ex 1 *Phyllostomus hastatus*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 24-27-VII-67; 1 male and 1 female ex 2 *Artibeus fuliginosus*, 29 males and 28 females ex *Sturnira tildae*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150-155 m, 1-1–2-II-67; 27 males and 25 females, same host, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 2-3-II-67; 5 males and 3 females, same host, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 6-III-67; 1 male, same host, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 29-V-67; 7 males, 4 females, and 1 sex undet., same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 14-IV-67; 1 female, same host, Río Orinoco, Tamatama, 135 m, 30-IV-67.

YARACUY: 1 female ex 1 *Uroderma bilobatum*, 10 km NW Urama, El Central, Urama, 25 m, 14-III-66.

HOST ASSOCIATIONS

Of 755 specimens of *Aspidoptera falcata* collected by the survey teams, 520 (69 percent) were from 310 *Sturnira lilium*, 143 (19 percent) were from 61 *Sturnira tildae*, 92 (12 percent) were from 54 *Sturnira ludovici*, and 8 (1 percent) were from 8 bats of 6 other species.

Of interest is the fact that *A. falcata* was collected from *S. lilium* at each of the three localities in Zulia at which *A. delatorrei* was taken, but not from the same individual bats.

REMARKS

I have restricted the type series of *Aspidoptera falcata* to specimens taken from *Sturnira lilium*, although specimens were commonly taken from *S. ludovici* and *S. tildae*.

The regular occurrence of *A. falcata* on three of the six species of *Sturnira* that were collected in Venezuela is interesting when compared with the host distribution of the closely related *delatorrei* in Central America (Wenzel et al., 1966). The type series of *delatorrei*, though small, were all taken from *Sturnira lilium parvidens* in Panama, Guatemala, and Mexico. None were taken from *S. ludovici*, although 50 percent of the 89 Panamanian specimens of this host that were examined for parasites were positive for Streblidae. However, *Trichobius brennani* Wenzel—a species that was not collected in Venezuela—was taken from almost 19 percent of those Panamanian specimens of *ludovici* that were parasitized by streblids. The absence of *brennani* in Venezuela is certainly not an "artifact of collecting," since 342 specimens of *ludovici* were examined for parasites, and more than 40 percent of these were positive for Streblidae. Interestingly, in Venezuela no specimens of *Aspidoptera* were taken from *Sturnira erythromos*, *S. bogotensis*, or *S. bidens*. Instead, these hosts were parasitized by a species of *Trichobius*—*Sturnira erythromos* and *S. bogotensis* by *Trichobius petersoni* n. sp. and *S. bidens* by *T. hispidus* n. sp. It should be noted that species of *Megistopoda* were taken from all of these hosts excepting *S. bidens*. The failure to retrieve a *Megistopoda* species from *S. bidens* may be due to inadequate sampling, since only 16 specimens of this bat were collected and 14 examined for parasites.

Aspidoptera phyllostomatis (Perty)

(Fig. 41, 42C)

Lipoptena phyllostomatis Perty, 1833:190, Pl. 37, Fig. 17

Aspidoptera phyllostomatis Jobling, 1949:137, Fig. 1.—Wenzel, Tipton, and Kiewlicz, 1966: 553, Fig. 103

Aspidoptera busckii Coquillett, 1899:335.—Wenzel, Tipton, and Kiewlicz, 1966:555. *New synonym.*

Wenzel et al. (loc. cit.) designated a male specimen figured by Jobling (loc. cit.) as the neotype of *Aspidoptera phyllostomatis* (Perty). They illustrated the postgonites of another male that was collected with the neotype and of a male of *Aspidoptera busckii* Coquillett. Though otherwise inseparable, these appeared to be distinct in the shape of the postgonites and for this reason were treated as distinct species. I have reexamined these specimens of *phyllosto-*

matis as well as a number of slide preparations of *A. busckii* and have concluded that the differences figured resulted from differences in orientation in the slide preparations, and possibly from some crushing of the postgonites in the single genital preparation of *A. phyllostomatis*. I now agree with Jobling (loc. cit.) that *busckii* is a synonym of *phyllostomatis*.

VENEZUELAN SURVEY RECORDS (189 males, 166 females, 5 sex undet.)

Aspidoptera phyllostomatis was taken in 14 states in 48 localities, wherever *Artibeus jamaicensis*, its characteristic host, occurred, as follows: Apure (1 locality, 24 m); Barinas (2 localities, 609-794 m); Bolívar (3 localities, 190-851 m); Carabobo (4 localities, 598-1,537 m); Falcón (5 localities, 2-480 m); Guárico (1 locality, 630 m); Lara (1 locality, 528 m); Miranda (5 localities, 1-1,180 m); Monagas (2 localities, 1,160-1,170 m); Sucre (5 localities, 1-175 m); T. F. Amazonas (6 localities, 119-150 m); Trujillo (5 localities, 29-164 m); Yaracuy (1 locality, 395 m); Zulia (7 localities, 24-1,135 m).

HOST ASSOCIATIONS

Of 359 specimens of *Aspidoptera phyllostomatis* collected by the survey teams, 343 (95.5 percent) were from 227 *Artibeus jamaicensis*, and the remaining 16 specimens were from 14 bats of the following 7 species: *Anoura caudifer*, *Artibeus fuliginosus*, *A. lituratus*, *Glossophaga soricina*, *Phyllostomus hastatus*, *Pteronotus parnellii* and *Uroderma bilobatum*.

Genus *Exastinion* Wenzel

Exastinion Wenzel, 1966:558

TYPE SPECIES: *Aspidoptera clovisi* Pessôa and Guimarães, 1937:262

This genus was erected to accommodate a single species, *Aspidoptera clovisi*. Pessôa and Guimarães (loc. cit.) described and figured *clovisi* as having a single large eye facet, as did Jobling (1949:138, Fig. 2). Wenzel et al. (1966: 560) noted this and pointed out that in all of their slide preparations of *clovisi* the eyes had five to six facets. By coincidence all these slides were of specimens from *Anoura cultrata*.[7] Restudy of their material shows that the specimens with faceted eyes, from *A. cultrata*, represent an undescribed species and also reveal the existence of another undescribed species with faceted eyes. Thus, the Panamanian and Venezuelan specimens which they recorded from *A. cultrata* are *Extastinion oculatum* n. sp., the Panamanian specimens from *A. geoffroyi* are *E. clovisi* (as are the Guatemalan and Trinidadian specimens which they alluded to), and the Colombian and Ecuadorian specimens which they mentioned are *E. deceptivum* n. sp.

Key to the Species of *Exastinion*

1. Eyes with a single large facet. Scutum with 8 setae. FEMALE. Ventral arc with distinct laterally projecting flanges (visible only in slide preparations) .... *clovisi* Pessôa and Guimarães

   Eyes with 5-6 very small facets. FEMALE. Ventral arc without laterally projecting flanges 2

2. Scutum with 10 setae. Sternum 2 densely setose, the median discal setose area extending anteriorly nearly to base .... *oculatum* n. sp.

   Scutum with 15-16 setae. Sternum 2 with fewer setae, the setose area extending anteriorly only to midlength or slightly beyond .... *deceptivum* n. sp.

Exastinion clovisi (Pessôa and Guimarães)

(Fig. 43A-C)

Aspidoptera clovisi Pessôa and Guimarães, 1937: 262, Fig. 5, 6

Exastinion clovisi, Wenzel, Tipton, and Kiewliez, 1966:560, part, Fig. 105A-D and records from *Anoura geoffroyi*

The following may be added to the description of Pessôa and Guimarães (loc. cit.):

Head. Underside of palpi usually setose on less than basal half. *Thorax*. Scutum typically with 8 setae. Metasternal lobe well developed, longer than broad. *Abdomen*. Lateral lobes of tergum 1+2 with ± 15 macrosetae and ± 18 short setae. Sternum 2 with setose area extending anteriorly to near or slightly beyond midlength. FEMALE. Dorsolateral abdominal connexivum with a cluster of ± 5 setae that are a little longer than the short setae following, which become slightly shorter apically. Seventh sternites with 17-18 setae, ± 12 of these macrosetae or of intermediate length, the others short. MALE. Sternum 7+8 with ± 10 setae on each

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[7] The Venezuelan specimens were recorded as being from *Anoura aculeata*, an unfortunate misspelling on the original labels for A. *cultrata*.

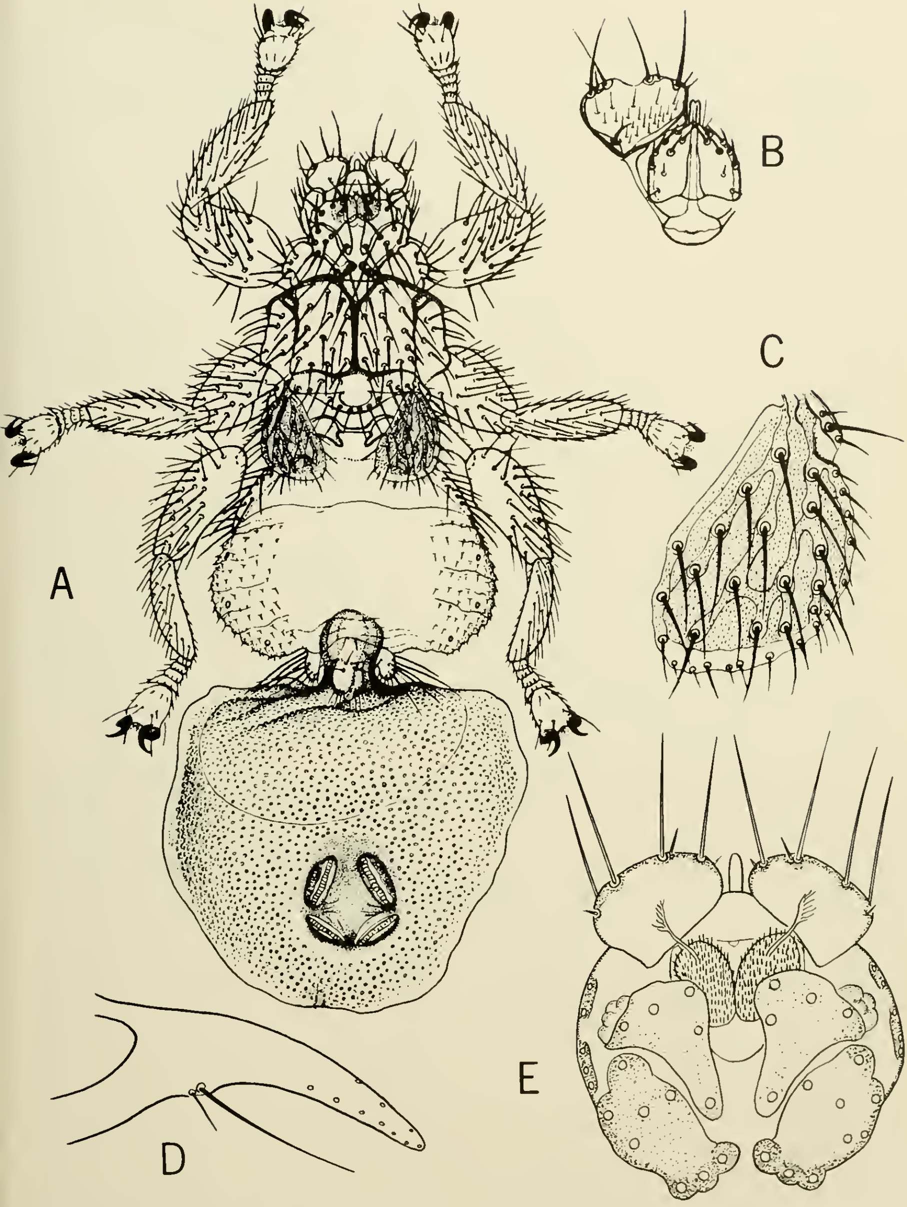

Fig. 43. A-C, *Exastinion clovisi* Pessôa and Guimarães: A, female, with extruding puparium, dorsal view; B, labium and palpus; C, wing. D-E, *Exastinion oculatum*, new species: D, left male postgonite; E, head, dorsal view, setae omitted. A-C from Jobling (1949); D-E from Wenzel et al. (1966; as *Exastinion clovisi*).

side, – 3 of the ventral setae shorter or short, the rest of them macrosetae. Tergum 9 with 16 setae, mostly macrosetae, which on each side become shorter ventrally.

Venezuelan Survey Records (181 males, 158 females, 1 sex undet.)

BARINAS: 1 female ex *Anoura caudifera*, 2 males ex *Anoura geoffroyi*, 2 km SW Altamira, Altamira, 609-611 m, 31-XII-67—3-I-68; 1 male and 1 female, same host, Altamira, 794 m, 20-XII-67.

BOLÍVAR: 11 males and 6 females ex *Anoura geoffroyi*, 6 males and 3 females ex *Anoura* sp. A, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 9-23-VI-66; 10 males and 8 females, same host, 18 males and 19 females ex *Anoura geoffroyi*, 85 km SSE El Dorado, Km 125, 1,032-1,165 m, 10-26-V-66; 4 males and 3 females, same host, 20 km W La Paragua, Hato San José, 300-306 m, 4-10-IV-67; 3 males and 1 female, same host, 21 km NE Icabarú, El Pauji, Icabarú, 851 m, 7-V-68; 4 males and 2 females ex *Anoura* sp. A, 50 m, 4-V-67.

CARABOBO: 6 males and 7 females ex *Anoura caudifera*, 2 males and 4 females ex *Anoura geoffroyi*, 4 males and 4 females ex *Anoura* sp. A, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 26-30-XI-67; 2 males and 3 females ex *Anoura geoffroyi*, 2 km SE Montalbán Potrerito, Montabán, 598 m, 1-XI-67.

DTO. FEDERAL: 2 males and 1 female ex *Anoura* sp. A, 4 km NNW Caracas, Los Venados, 1,465-1,524 m, 28-VII—15-VIII-65; 7 males and 4 females, same host, 5 km NNE Caracas, nr. Hotel Humboldt, Pico Ávila, 2,150-2,240 m, 18-VIII—1-IX-65; 1 female, same host, 6 km NNW Caracas, nr. Boca Tigre, Pico Ávila, 2,025 m, 30-VIII-65.

FALCÓN: 4 females ex *Anoura geoffroyi*, 14 km ENE Mirimire, nr. La Pastora, 60-122 m, 21-27-XI-67; 1 male and 1 female, same host, 16 km ENE Mirimire, nr. La Pastora, 70 m, 30-XI-67.

GUÁRICO: 3 males ex *Anoura geoffroyi*, 10 km NE Altagracia, Hda. Elvira, 630 m, 16-IX-66.

MIRANDA: 1 female ex *Anoura geoffroyi*, Birongo, 60 m, 22-I-68.

MONAGAS: 7 males and 3 females ex *Anoura geoffroyi*, 5 km NW Caripe, San Agustín, 1,150-1,170 m, 25-VI—6-VII-67.

SUCRE: 2 males ex *Anoura geoffroyi*, 1 male and 1 female ex *Anoura* sp. A, 26 km ESE Carúpano, Manacal, 366 m, 19-VII-67; 34 males and 20 females ex *Anoura geoffroyi*, 9 km NE Güiria, Ensenada Cauranta, 7 m, 13-16-VI-67.

T. F. AMAZONAS: 1 male and 1 female ex *Peropteryx macrotis*, 1 male and 1 female ex *Anoura geoffroyi*, 30 km S Pto. Ayacucho, Platanilla, Pto. Ayacucho, 119 m, 12-13-X-67; 8 males and 15 females, same host, 21 males, 26 females, and 1 sex undet. ex *Anoura* sp. A, 1 female ex 1 *Artibeus jamaicensis*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 21-28-VII-67; 11 males and 10 females ex *Anoura geoffroyi*, Cabecera del Caño Culebra, 40 km NNW Esmeralda, 1,200-1,400 m, 4-8-II-67; 2 males and 2 females, same host, 14 km SSE Pto. Ayacucho, El Gavilan, Pto. Ayacucho, 135 m, 11-X-67; 5 males and 4 females, same host, 20 km S Pto. Ayacucho, Las Queseras, Pto. Ayacucho, 135 m, 21-IX-67.

ZULIA: 1 male ex *Pteropteryx macrotis*, 1 male ex *Anoura geoffroyi*, 21 km SW Machiques, Kasmera, 270 m, 15-IV-68.

Remarks

There are slight differences in body and wing measurements between specimens of *Exastinion clovisi* from *Anoura geoffroyi*, *A. caudifer*, and *Anoura* sp. A. However, these do not appear to be statistically significant, and I cannot detect any other differences, e.g., in chaetotaxy or structure of the male postgonites. I provisionally refer all of these specimens to *clovisi*, though *A. caudifer* does not share any other streblids with other species of *Anoura*. Further analysis of these collections seems desirable.

Exastinion oculatum, new species

(Fig. 43D, E)

Exastinion clovisi, Wenzel, Tipton, and Kiewlicz, 1966:560, in part (Fig. 105B, E, and records from *Anoura cultrata*), not Pessôa and Guimarães, 1937

Aside from having faceted eyes, *Exastinion oculatum* n. sp. is distinct from *clovisi* in its intensively setose sternum 2, the setose area extending nearly to base rather than to middle or slightly beyond; in the more extensive setation of the underside of the palpi, and in possessing 10 rather than 8 scutal setae. For differences between *oculatum* n. sp. and *deceptivum* n. sp., see *deceptivum* n. sp., below.

The published descriptions and figures of *E. clovisi* (see above) apply equally well to *oculatum* n. sp., except as follows.

Description

Head. Eyes with 5-6 small facets. Palpi with numerous short setae on slightly more than basal half. *Thorax.* Scutum typically with 10 long setae, 5 on each side. Metasternal lobe

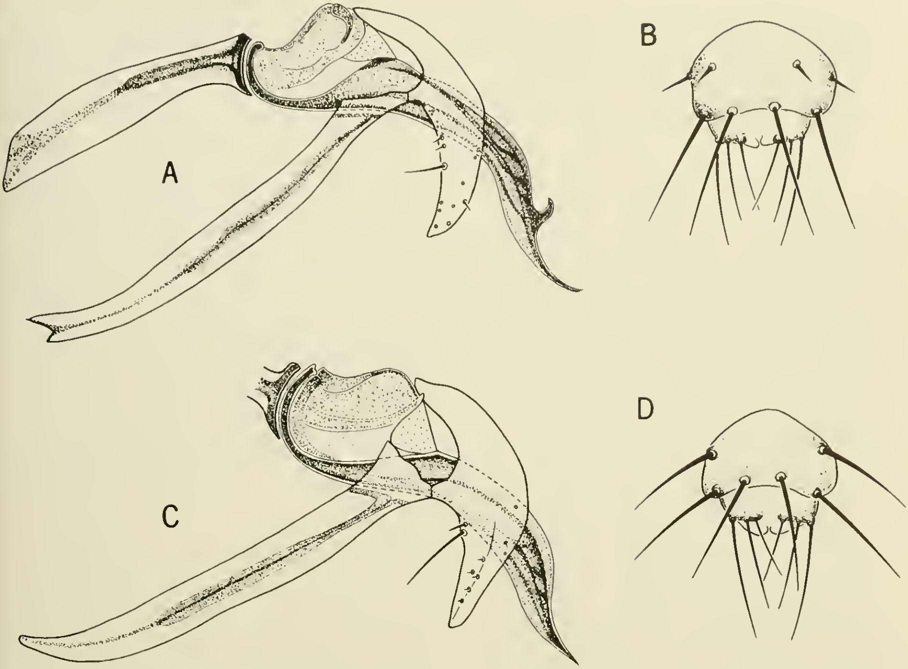

Fig. 44. *Noctiliostrebla aitkeni* Wenzel: A, female, dorsal view; B, labium; C, wing. From Jobling (1949; as *Aspidoptera megastigma*).

short, usually broader than long. *Abdomen.* Lateral lobes of tergum 1+2 with ± 17 long macrosetae, ± 5 shorter setae ventral to these, and below these 13-15 shorter setae (these longer than in *deceptivum*). Sternum 2 with thorn-like setae, the setose area extending anteriorly nearly to base; setae along posterior margin of nearly the same size as those on disc, but those around posterior angles much longer, several of them macrosetae. Lateral lobes of tergum 1+2 each with ± 17 macrosetae dorsally, and ventral to these ± 5 shorter macrosetae and 13-15 short setae, these much longer and more conspicuous than in *E. deceptivum* n. sp. FEMALE. Dorsolateral abdominal connexivum with a cluster of 10-12 conspicuous setae, some of them 2-3 times as long as those following, these becoming shorter distally, the apical ones very short. Seventh sternites with ± 18 setae, ± 12 of these macrosetae, the others shorter or short. MALE. Sternum 7+8 with ± 12 setae, the upper ones macrosetae, the others becoming shorter ventrally. Tergum 9 with ± 15 setae, the more dorsal ones macrosetae, the others becoming shorter ventrally.

MEASUREMENTS

	Males	Females
BL	1.08-1.54	1.31-1.57
TL	0.39-0.47	0.44-0.47

TYPE DATA: Male holotype (FMNH) and female allotype (FMNH) ex *Anoura cultrata* (Tipton-Handley 10399), Panamá, Chiriquí, Cerro Punta, Casa Tilley, 5,300-5,600 ft, 12-III-62, C. M. Keenan and V. J. Tipton. PARATYPES—PANAMÁ. BOCAS DEL TORO: 7 males and 5 females ex *Anoura cultrata*, 2,500 ft., 27-IX-61, C. M. Keenan and V. J. Tipton. CHIRIQUÍ: 1 male, same data as the holotype. Darién: 12 males and 7 females ex *Anoura cultrata*, Cerro Tacarcuna, 4,100-4,800 ft., 21-II—10-III-64, C. O. Handley, Jr.; 8 males and 7 females, same host, Cerro Malí, 2-II-64, 4,100-4,800 ft., C. O. Handley, Jr. VENEZUELA. ARAGUA: 5 males and 3 females ex *Anoura cultrata*, Rancho Grande, El Limón, 3,576 ft., 30-III-60, C. O. Handley, Jr. Mérida: 1 male and 1 female ex *Anoura cultrata* (SVP), 6 km SE La Azulita, La Carbonera, 1,870 m, 23-IV-66. Miranda: 1 male ex *Anoura cultrata* (SVP), 4 km SW Birongo, Cueva Walter Dupouy, Birongo, 195 m, 28-I-68.

Exastinion deceptivum, new species

Exastinion deceptivum n. sp. resembles *oculatum* n. sp. in having 5-6 eye facets, but differs conspicuously in having 15 rather than 10 scutal setae.

As with *E. oculatum* n. sp., the description and figures of *E. clovisi* Pessôa and Guimarães generally applies to *deceptivum*, too. The following description includes those characters in which *deceptivum* differs or those that were not mentioned in the description of *clovisi*.

Description

Head. Eyes small, typically with 6 facets. Underside of palpi setose on ± basal half. *Thorax*. Scutum with 15-16 setae. Metasternal lobe well developed, longer than broad as in *clovisi*. *Abdomen*. Lateral lobes of tergum 1+2 with 17-20 long macrosetae and 15-17 short setae. Sternum 2 with median setose area extending anteriorly to or slightly beyond midlength. Dorsolateral connexivum with a cluster of 10-12 longer setae behind lateral lobes of tergum 1+2, the setae following them shorter but not conspicuously so, becoming only slightly shorter distad, the distal ones longer than in either *clovisi* or *oculatum*. Seventh sternites with ± 16 setae, including ± 8 macrosetae, ± 6 short setae, and ± 2 of intermediate length. Male. Sternum 7+8 typically with 7 setae, 5-6 of them macrosetae. Tergum 9 with 16-17 setae, including macrosetae, the ventral ones shorter.

Measurements

	Males	Females
BL	1.52-1.64	1.74-2.06
TL	0.47-0.52	0.50-0.54

Type Data: Male holotype (FMNH) and female allotype (FMNH) ex *Anoura geoffroyi peruana* (CJM 4934), Colombia, Cundinamarca: 12 km NNE of Bogotá, La Calera, 23-IV-66, C. J. Marinkelle. Paratypes—COLOMBIA. Antioquia: 4 males and 5 females (FMNH) ex *Anoura geoffroyi*, Urrao, Paramo de Frontino, 3,100 m, 2-III-51, P. Hershkovitz (FMNH Colombian Zool. Exped.). Cundinamarca: 2 females ex *Anoura geoffroyi*, Zipaquira, Paramo de Guerrero, 3,150 m, 3-VI-52, P. Hershkovitz (FMNH Colombian Zool. Exped.); 4 males and 1 female (FMNH), same data as the holotype; 2 males and 1 female (MCZ) ex *Anoura geoffroyi apolinari* [= *peruana*], Bogotá, H. Osorno. ECUADOR. Azuay: 3 males and 1 female (AMNH) ex *Anoura geoffroyi peruana*, Cuenca, 13-VII-22. VENEZUELA. Mérida: 4 males and 5 females ex 3 *Anoura geoffroyi*, Tabay, 6 km ESE Tabay, Middle Refugio, 2,550 m, 15-IV-66; 3 males, same host, La Carbonera, 12 km SE La Azulita, 2,190 m, 21-IV-66. Miranda: 2 females ex *Anoura geoffroyi*, Curupao, 5 km NNW Guarenas, 1,160 m, 6-X-66. Monagas: 2 males and 5 females ex *Anoura geoffroyi*, San Agustín, 5 km NW Caripe, 1,160-1,165 m, 27-VI–3-VII-67.

Other Material Examined:

Colombia. Nariño: 1 male ex *Sturnira bidens*, 6,000 ft., 12-VI-70, Kjell von Sneidern; 1 male ex *Artibeus* sp., La Victoria, 8,000 ft., 16-V-70, K. von Sneidern.

Remarks

Both *Exastinion clovisi* Pessôa and Guimarães and *E. deceptivum* n. sp. were taken from bats identified as *Anoura geoffroyi*. Unfortunately, the Venezuelan bats were not identified to subspecies, but the Colombian records of *deceptivum* from *A. geoffroyi peruana* suggest that the Venezuelan hosts of this fly may also have been *A. g. peruana*. However, the host species or subspecies of *Anoura* may be less important than altitude in determining the distribution of *clovisi* and *deceptivum*. *Exastinion clovisi* has been taken from *A. g. geoffroyi*, *A. g. lasiopyga*, and *A. caudifera* at generally much lower elevations than those at which most specimens of *deceptivum* were collected.

Genus *Noctiliostrebla* Wenzel

Noctiliostrebla Wenzel, 1966:560

Type Species: *Lipoptena dubia* Rudow, 1871:122

The species of *Noctiliostrebla*, like those of *Paradyschiria* (see below), are characteristic parasites of the fish-eating bats of the genus *Noctilio*. *Noctilio labialis* is normally parasitized by *Noctiliostrebla maai*, at least in Central America and northern South America. In Venezuela, *Noctilio leporinus* is parasitized by at least three species of *Noctiliostrebla*—by *N. traubi* Wenzel in northwestern Venezuela; by *N. aitkeni* Wenzel in the eastern half; and in the far south of T. F. Amazonas by *N. dubia*

(Rudow) and *N. aitkeni* Wenzel, where at two localities in Amazonas, individual host specimens were found that were parasitized by both these species. Specimens of *dubia* and *aitkeni* were also found together on several individual bats of a series of *Noctilio leporinus* that were taken in Amazonian Brazil (Para; Río Tapajoz, Ilha de Urucurituba, A. M. Olalla).

Key to Venezuelan Species of *Noctiliostrebla*

Males

1. Posterior margin of sternum 2 strongly produced apically, the median marginal setae forming a pseudoctenidium (Fig. 45C) .... *traubi* Wenzel
   Posterior margin of sternum 2 straight or feebly arcuate, sometimes feebly emarginate along middle (Fig. 45D) 2
2. Sternum 2 nearly flat or evenly convex at middle, setae normal. Median wing vein usually with 1 or 2 setae 3
   Sternum 2 strongly tumid in an elongate, roughly triangular area along midline, this area covered with numerous short, often thornlike setae (Fig. 45E), those along margin of this median area shorter than those lateral to them and often thornlike. Median wing vein with 2-4 (usually 3) setae .... *dubia* (Rudow)
3. Ventral processes of hypopygium flared at apex .... *aitkeni* Wenzel
   Ventral processes of hypopygium with weak, knoblike apices .... *maai* Wenzel

Females

1. Posterior margin of sternum 2 emarginate at middle 2
   Posterior margin of sternum 2 feebly outwardly arcuate or nearly straight 3
2. Sternum 2 shorter, not deeply emarginate (Fig. 45A). Median wing vein without setae .... *traubi* Wenzel
   Sternum 2 very long and deeply emarginate, the emargination extending anteriorly beyond midlength. Median wing vein with 2-4 (usually 3) setae .... *dubia* (Rudow)
3. Dorsal abdominal connexival setae of relatively uniform length, excepting a cluster of 14-16 longer (but not strikingly longer) and stronger setae on each side behind the lateral lobes of tergum 1+2 and 1 or 2 pairs of much longer, strong setae at apex of setose area .... *maai* Wenzel
   Dorsal abdominal connexivum with a basal cluster ± 12 very long, conspicuously stronger setae on each side behind lateral lobes of tergum 1+2, these continued on each side as a longitudinal band of shorter setae which, however, are distinctly longer than the setae along middle and sides of connexivum (in gravid specimens this longitudinal band breaks up into groups that are situated medial to the spiracles) .... *aitkeni* Wenzel

Noctiliostrebla dubia (Rudow)

(Fig. 45E)

Lipoptena dubia Rudow, 1871:122
Noctiliostrebla dubia Wenzel, Tipton, and Kiewlicz, 1966:563
Lepopteryx megastigma Speiser, 1900:54, Pl. 3, Fig. 2, new synonym
Noctiliostrebla megastigma Wenzel, Tipton, and Kiewlicz, 1966:564

Earlier, Wenzel et al. (loc. cit.) examined the types of *Lipoptena dubia* Rudow, which were made available through the courtesy of Prof. Herbert Weidner of the Hamburg Museum. The Venezuelan specimens recorded below compare well with descriptive notes and illustrations of *dubia* made at that time.

In general, *Noctiliostrebla dubia* Rudow has the characters of *N. traubi* (Wenzel). As in that species, sternum 2 of the female is large and apically emarginate. The ventral processes of the male hypopygium and the male terminalia are similar, including the presence of a dorsal, subapical, thornlike spine on the aedeagus. The females differ conspicuously in the shape and emargination of the second abdominal sternum (see key) and in the dorsal abdominal chaetotaxy. In *traubi*, the dorsal connexivum possesses a cluster of seven to eight longer and coarser setae behind the lateral lobes of tergum 1+2;

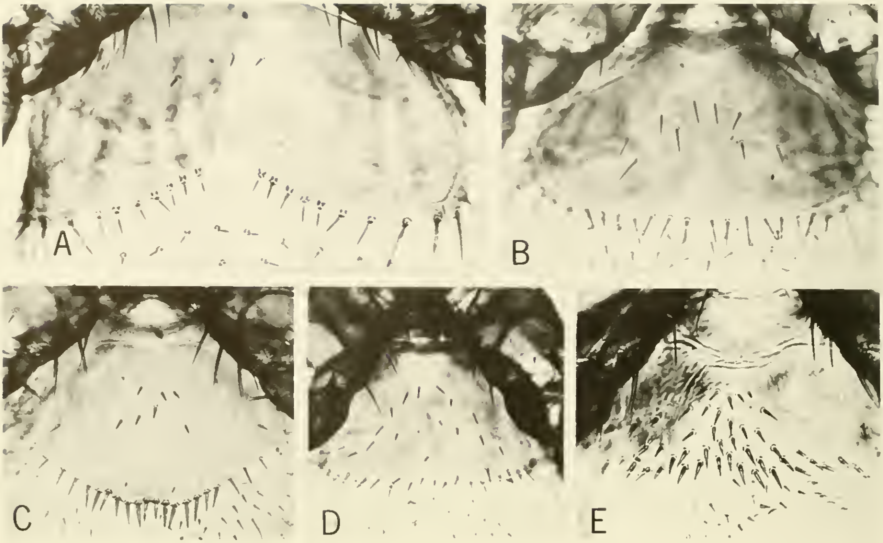

Fig. 45. A, C, *Noctiliostrebla traubi* Wenzel: A, sternum 2, female; C, sternum 2, male. B, D, *Noctiliostrebla maai* Wenzel: B, sternum 2, female; D. sternum 2, male. E, *Noctiliostrebla dubia* (Rudow): sternum 2, male.

elsewhere it is rather uniformly clothed with much shorter setae, but these are longer than those along lateral margins and venter; a few longer setae are also present near apex. In *dubia*, the setae of the cluster behind the lateral lobes of tergum 1+2 are longer than in *traubi* and are continued along the length of the dorsum on each side as a longitudinal band of only slightly shorter setae, these conspicuously longer than in *traubi;* setae of the median area are much shorter. Other differences between *dubia* and *traubi* are given in the key.

Through the kindness of Dr. H. Schumann of the Berlin Museum and Dr. Karel Hurka of Charles University (Prague), I have also been able to examine one male and two females of Speiser's type series of five *Lepopteryx megastigma.* These specimens, which were without locality and originally mounted dry on cards, are now preserved in glycerin. They are in very poor condition.

The vial contains a label "Lecto-holotype/ of *megastigma*/Speis. [= *dubia*/Rudow]/♀/ T. C. Maa 1962," but there are two females. One of these, which is in better condition, appears to be *Noctiliostrebla traubi* Wenzel. The middle wing veins of this specimen lack setae and setal sockets as in *traubi.* The abdominal chaetotaxy is also that of *traubi,* as is the shape of abdominal sternum 2, although the posterior emargination is more evenly arcuate than in most specimens of *traubi.* This probably is in the specimen which Maa meant to designate as the lectoholotype.

The other female has deteriorated badly. Setal sockets are visible on the middle wing veins, and sternum 2 is very deeply emarginate, as in *N. dubia* Rudow. Despite the shriveled condition of the abdomen, the longitudinal bands of long dorsal connexival setae characteristic of *dubia* are evident. Although Speiser's figure (loc. cit.) of *megastigma* does not show setae on the middle wing vein, probably because they were broken off, it does illustrate the longitudinal bands of setae. The male specimen, too, is clearly *dubia.* Thus, Speiser's original series contained both *traubi* and *dubia,* probably from different localities.

Maa's designation of a lectoholotype has not been published. I have added a label to the vial designating the female of *dubia* as the lectoholotype of *Lepopteryx megastigma* Speiser, which thereby becomes a synonym of *Lipoptena dubia* Rudow.

At hand are two females (AMNH, mounted on slides) from Brazil (Amazonas, Cacão Pereira Igarapi, near Manaos), that resemble *dubia* in possessing two or three setae on the median wing vein, and in having a longitudinal band of coarse, longer setae along each side of dorsal abdominal connexivum. Sternum 2 is emarginate as in *traubi*, but shorter. The seventh tergites and sternites and the supra-anal plate are more heavily sclerotized than in either of these species and their setae coarser. The supra-anal plate has two shorter discal setae in addition to the pair of strong lateral setae and the distal macrosetae. These specimens appear to represent an undescribed species. Unfortunately, both are in very poor condition. Description of this interesting species should be deferred until more suitable material including males is available.

Venezuelan Survey Records (6 males, 3 females ex 3 *Noctilio leporinus*)

T. F. AMAZONAS: 1 male, 84 km SSE Esmeralda, 10 km up Río Mavaca, Boca Mavaca, 138 m, 20-III-67; 5 males and 2 females, 84 km SSE Esmeralda, 7 km up Río Mavaca, Boca Mavaca, 138 m, 2-III-67; 1 female, 108 km SSE Esmeralda, Río Mavaca, 140 m, 5-IV-67.

Other Venezuelan Material Examined

BRAZIL: 17 males and 14 females ex 8 *Noctilio leporinus*, Para, Río Tapajoz, Ilha de Urucurituba, 22-VI-61, A. M. Olalla (taken in association with *Noctiliostrebla aitkeni* from 5 of the 8 bats). I have also seen other specimens from Brazil (BMNH), without further locality, and from the Río Madeira [sic!] of Brazil (AMNH).

Noctiliostrebla traubi Wenzel

(Fig. 45A, C; 46C, D)

Noctiliostrebla traubi Wenzel, 1966:565, Fig. 106, 107B, D

Venezuelan Survey Records (101 males, 110 females)

CARABOBO: 1 male ex 1 *Noctilio labialis*, 4 males and 5 females ex *Noctilio leporinus*, 10 km NW Urama, El Central, Urama, 25 m, 17-23-III-66.

GUÁRICO: 1 female ex *Noctilio leporinus*, 35 km SSW San Juan de los Morros, Hto. Las Palmitas, 181 m, 7-I-68.

YARACUY: 52 males and 63 females ex *Noctilio leporinus*, 10 km NW Urama, El Central, Urama, 25 m, 8-14-III-66; 1 female, same host, 11 km NW Urama, El Central, Urama, 25 m, 14-III-66.

ZULIA: 40 males and 37 females ex *Noctilio leporinus*, 42 km WNW Encontrados, El Rosario, 24 m, 24-II–3-IV-68; 4 males and 3 females, same host, 33 km NW La Paz, nr. Cerro Azul, 75 m, 15-VI-68.

Host Associations

Of 211 specimens of *Noctiliostrebla traubi* collected by the survey teams, 210 (99.5 percent) were from *Noctilio leporinus*.

Remarks

Noctiliostrebla traubi is known to be from the Greater Antilles, Central America, the coastal lowlands of Peru and Colombia, and northwestern Venezuela.

Noctiliostrebla maai Wenzel

(Fig. 45B, D; 46A, B)

Noctiliostrebla maai Wenzel, 1966:569, Fig. 107A, 109

Venezuelan Survey Records (103 males, 116 females)

APURE: 1 female ex 1 *Molossus ater*, 9 males and 17 females ex *Noctilio labialis*, 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 14-28-XII-65; 14 males and 10 females, same host, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 6-28-XII-65; 3 males and 1 female, same host, Pto. Páez, 76 m, 17-I-66.

CARABOBO: 7 males and 3 females ex *Noctilio labialis*, 10 km NW Urama, El Central, Urama, 25 m, 17-III-66.

FALCÓN: 10 males and 5 females ex *Noctilio labialis*, 28 km WNW Pto. Cabello, Boca de Yaracuy, 2 m, 27-IX–4-X-65.

MIRANDA: 2 males and 2 females ex *Noctilio labialis*. 4 km E Río Chico, nr. Pto. Tuy, 1 m, 10-XI-66; 1 male and 2 females, same host, 5 km E Río Chico, nr. Pto. Tuy, 1 m, 17-XI-66; 1 male and 1 female, same host, 7 km E Río Chico, nr. Pto. Tuy, 1 m, 17-XI-66.

MONAGAS: 4 males and 5 females ex *Noctilio labialis*, 55 km SSE Maturín, Hato Mata de Bejuco, 18 m, 4-VI-68.

SUCRE: 1 female ex *Noctilio leporinus*, 9 km NE Güiria, Ensenada Cauranta, 1 m, 3-VI-67.

T. F. AMAZONAS: 1 female ex *Noctilio labialis*, 20 km S Pto. Ayacucho, Las Queseras, Pto. Ayacucho, 135 m, 24-IX-67; 4 males and 6 females, same host, 28 km S Pto. Ayacucho, Guayabal, Pto. Ayacucho, 135 m, 7-X-67; 6 males and 10 females, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 14-24-VII-67.

YARACUY: 5 males and 7 females ex *Noctilio labialis*, 11 km NW Urama, El Central, Urama, 25 m, 14-15-III-66; 34 males and 42 fe-

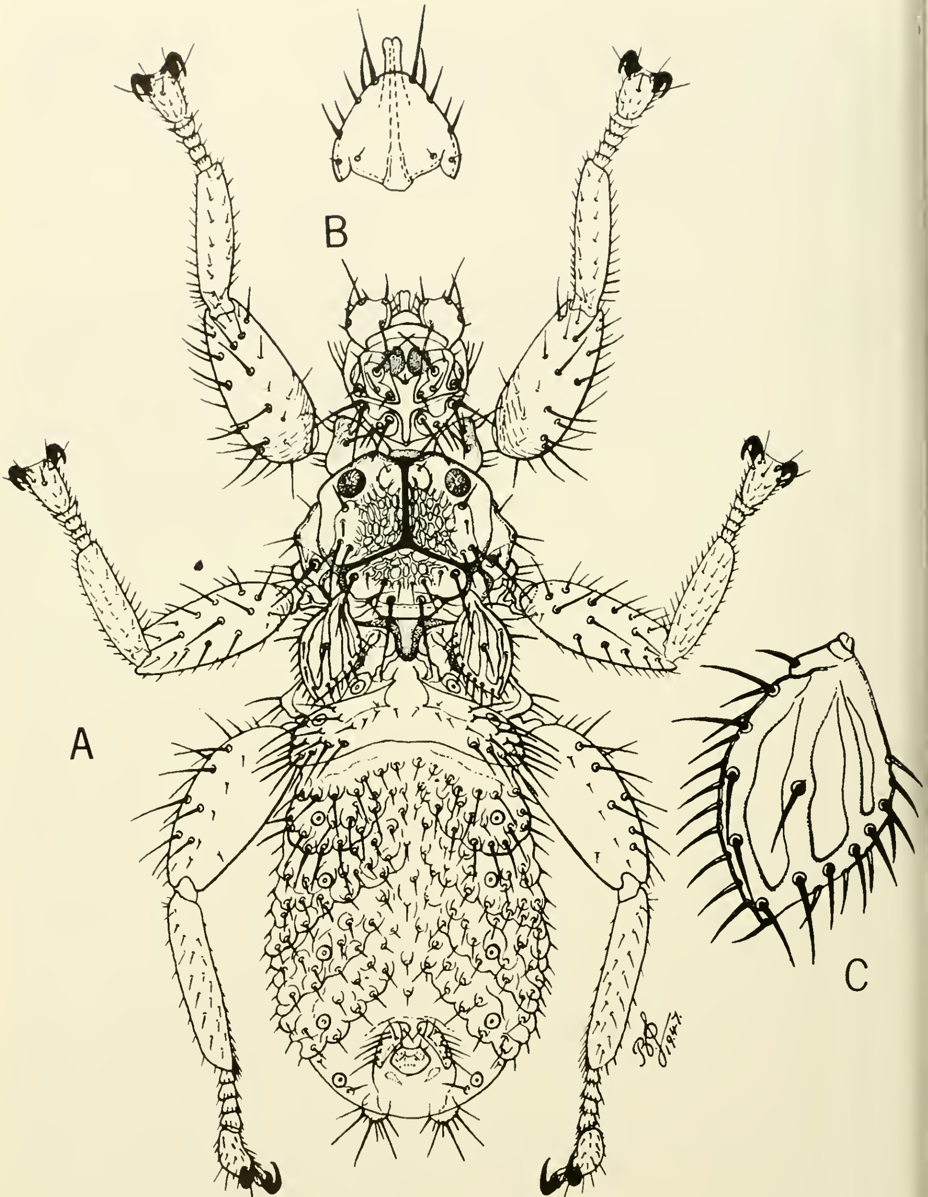

Fig. 46. A-B, *Noctiliostrebla maai* Wenzel: A, male genitalia; B, female supra-anal plate. C-D, *Noctiliostrebla traubi* Wenzel: C, male genitalia; D, female supra-anal plate. From Wenzel et al. (1966).

males, same host, 10 km NW Urama, El Central, Urama, 25 m, 8-14-III-66.

ZULIA: 2 males and 2 females ex *Noctilio labialis,* 42 km WNW Encontrados, El Rosario, 24 m, 5-III-68.

Other Venezuelan Material Examined

BOLÍVAR: 2 males ex *Noctilio labialis* (Machado-Allison No. 598), Playa del Medio, 19-IV-61, J. Ojasti.

Host Associations

Of 219 specimens of *Noctiliostrebla maai* collected by the survey teams, 217 (99 percent) were from 86 *Noctilio labialis.* The single specimen from *Molossus ater* is probably a stray or a transitory parasite, and the single record from *Noctilio leporinus* is so unusual that one suspects a misidentification of the host.

Noctiliostrebla aitkeni Wenzel

(Fig. 44)

Noctiliostrebla aitkeni Wenzel, 1966:567, Fig. 107C, 108

Aspidoptera megastigma Speiser of Jobling (part), 1949a:140, Fig. 3A-C

Venezuelan Survey Records (58 males, 59 females, 1 sex undet.)

BOLÍVAR: 12 males and 16 females ex *Noctilio leporinus,* 50 km SE El Manteco, Río Supamo, 150 m, 8-11-IV-66.

MIRANDA: 2 males ex *Noctilio leporinus,* 5 km E Río Chico, nr. Pto. Tuy, 1 m, 21-XI-66; 11 males, 16 females, and 1 sex undet., same host, 7 km E Río Chico, nr. Pto. Tuy, 1 m, 5-9-XI-66.

MONAGAS: 1 male and 1 female ex *Noctilio leporinus,* 55 km SSE Maturín, Hato Mata de Bejuco, 18 m, 3-VI-68.

SUCRE: 3 males and 2 females ex *Noctilio leporinus,* 9 km NE Güiria, Ensenada Cauranta, 1 m, 3-VI-67.

T. F. AMAZONAS: 1 male ex 1 *Saccopteryx bilineata,* 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 12-I-67; 3 males and 2 females ex *Noctilio leporinus,* 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 12-I–2-II-67; 10 males and 5 females, same host, 84 km SSE Esmeralda, 19 km up Río Mavaca, Boca Mavaca, 138 m, 20-III-67; 4 males and 5 females, same host, 84 km SSE Esmeralda, 7 km up Río Mavaca, Boca Mavaca, 138 m, 1-III-67; 8 males and 7 females, same host, 84 km SSE Esmeralda, 9 km up Río Mavaca, Boca Mavaca, 138 m, 10-III-67; 3 males and 5 females, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 5-IV-67.

YARACUY: 1 male ex *Noctilio leporinus,* 11 km NW Urama, El Central, Urama, 25 m, 14-15-III-66.

Host Associations

Of 118 specimens of *Noctiliostrebla aitkeni* collected by the survey teams, 117 (99 percent) were from 19 *Noctilio leporinus.* The single specimen from *Saccopteryx bilineata* is probably a contaminant or transitory association.

Genus *Paradyschiria* Speiser

Paradyschiria Speiser, 1900:55

Type Species: *Paradyschiria fusca* Speiser, 1900:56

The flies of this genus, too, are parasites on noctilionid bats. It should be noted that the males possess two very small, oval, transverse sternites that appear to be remnants of the fifth sternum.

Key to the Known Species of *Paradyschiria*

Males

1. Mesonotum lacking a short seta lateral to and usually anterior to the posterior macroseta. Setae of dorsal connexivum of about same length as those along middle of apical margin of sternum 2. Ventral margins of postgonites nearly straight, apices not hooked (Fig. 49A) 2
   Mesonotum usually with a short seta lateral to the posterior macroseta. Setae of dorsal connexivum distinctly shorter than median setae on posterior margin of sternum 2. Postgonites strongly curved, sickle shaped (Fig. 49C) or, if not, the apices are slightly but distinctly hooked (Fig. 49B) 3

2. Posterior margin of each lateral lobe of tergum usually with 1 (rarely 2) macrosetae that are conspicuously longer than the others .... *lineata* Kessel
   Posterior margin of each lateral lobe of tergum 1+2 usually with 2 or 3 long, subequal macrosetae that are conspicuously longer than the others .... *fusca* Speiser

3. Postgonites strongly bent, sickle shaped (Fig. 49C) .... *curvatas* n. sp.
   Postgonites not thus 4

4. Postgonites rather abruptly tapered on distal half (Fig. 49B) .... *parvuloides* Wenzel
Postgonites rather evenly tapered to apex, ventral margins nearly straight, much as in *lineata* (Fig. 49A), but apices distinctly hooked. .... *parvula* Falcoz

FEMALES

1. Mesonotum lacking a short seta anterior and lateral to the long macroseta of posterolateral angle. Lateral abdominal connexivum on each side with an elongate-oval, vertical sclerite between posterior margin of lateral lobe of tergum 1+2 and spiracle 3. Supra-anal plate (Fig. 48B) with a macroseta in each basolateral angle 2
Mesonotum (Fig. 47A) usually with a short seta on each side anterior and lateral to the long posterior macroseta. Lateral connexivum without a vertical sclerite. Supra-anal plate (Fig. 48D) lacking a macroseta in basolateral angles 3

2. Posterior margin of tergum 1+2 usually with 1 (rarely 2) macrosetae that are conspicuously longer than the others. Middorsal setae of abdominal connexivum conspicuously shorter than those lateral to them, those near base and apex shortest, the apical ones less than half as long as the setae lateral to them. Supra-anal plate (Fig. 48B) usually with the basolateral macrosetae more widely separated than the outer setae of apical margin .... *lineata* Kessel
Posterior margin of tergum 1+2 usually with 2 or 3 long, subequal macrosetae that are conspicuously longer than the others. Most of middorsal setae of abdominal connexivum shorter than those lateral to them, but not markedly so, many of them more than half as long as the setae lateral to them. Basolateral macrosetae of supra-anal plate usually no more widely separated than outer macrosetae of apical margin .... *fusca* Speiser

3. Seventh sternites elongate, longer than broad, without any short, stouter, spinelike setae along distal margin .... *parvula* Falcoz
Seventh sternites suborbicular or transversely oval with 1-4 short, spinelike setae along distal margin (Fig. 48C) 4

4. Supra-anal plate distinctly longer than broad, sides subparallel, the anterior margin broadly rounded. Seventh sternites each with 1-2 heavier, short, spinelike setae on apical margin, the other setae normal. Ventral arc of terminal cone with a broad anteriorly directed extension which projects forward internally and recurves ventrally and then posteriorly to terminate near the distal flanges of the seventh sternites; this scooplike structure easily visible through the integument of cleared specimens .... *curvata* n. sp.
Supra-anal plate slightly wider than, or as wide as long, the basal (anterior) margin roundly angulate. Seventh sternites (Fig. 48C) each with 3-4, rarely 2, spinelike setae on distal margin. Ventral arc of terminal cone with only a relatively short, ventrally directed, lobelike extension .... *parvuloides* Wenzel

Paradyschiria parvula Falcoz

Paradyschiria parvula Falcoz, 1931:267.—Wenzel, Tipton, and Kiewlicz, 1966:574
Paradyschiria dubia, authors (part), not Rudow

VENEZUELAN SURVEY RECORDS (430 males, 392 females, 1 sex undet.)

APURE: 1 male ex *Noctilio labialis*, Pto. Páez, 76 m, 17-I-66.

CARABOBO: 27 males and 25 females ex *Noctilio labialis*, 10 km NW Urama, El Central, Urama, 25 m, 17-III-66.

FALCÓN: 25 males and 29 females ex *Noctilio labialis*, 28 km WNW Pto. Cabello, Boca de Yaracuy, 2 m, 23-IX—4-X-65; 13 males and 8 females, same host, 19 km NW Urama, Km 40, Urama, 25 m, 29-X—12-XI-65.

MIRANDA: 4 males and 2 females ex *Noctilio labialis*, 4 km E Río Chico, nr. Pto. Tuy, 1 m, 10-XI-66; 11 males and 9 females, same host, 5 km E Río Chico, nr. Pto. Tuy, 1 m, 17-XI-66; 11 males and 11 females, same host, 7 km E Río Chico, nr. Pto. Tuy, 1 m, 5-17-XI-66.

MONAGAS: 6 males and 8 females ex *Noctilio labialis*, 55 km SSE Maturín, Hato Mata de Bejuco, 18 m, 4-VI-68.

T. F. AMAZONAS: 1 female ex 1 *Molossus aztecus*, 2 males and 1 female ex 3 *Molossus ater*, 156 males, 142 females, and 1 sex undet. ex *Noctilio labialis*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 14-24-VII-67; 47 males and 45 females, same host, 28 km S Pto. Ayacucho, Guayabal, Pto. Ayacucho, 135 m, 7-X-67; 1 male, same host, 20 km S Pto. Ayacucho, Las Queseras, Pto. Ayacucho, 135 m, 24-IX-67.

YARACUY: 104 males and 81 females ex *Noctilio labialis*, 10 km NW Urama, El Central, Urama, 25 m, 8-14-III-66; 32 males and 30 females, same host, 11 km NW Urama, El Central, Urama, 25 m, 15-III-66.

HOST ASSOCIATIONS

Of 823 specimens collected by the survey teams, 819 (99.5 percent) were from 113 *Noctilio labialis*. The records from *Molossus aztecus* and *M. ater* could represent contaminants or transitory transfers. The host specimens of both species of *Molossus* as well as specimens of *N. labialis* were collected "near stream in tree" (probably the same tree) on the same date.

Paradyschiria parvuloides Wenzel

(Fig. 47A, 48C, D; 49B)

Paradyschiria parvuloides Wenzel, 1966:575, Fig. 110D, 112C-D, 113B, 114A-B

VENEZUELAN SURVEY RECORDS (25 males, 18 females ex 6 *Noctilio labialis*)

APURE: 1 male, Pto. Páez, 76 m, 17-I-66.

TRUJILLO: 13 males and 8 females, 47 km WNW Valera, La Ceiba, 29 m, 19-II-66.

ZULIA: 11 males and 10 females, 42 km WNW Encontrados, El Rosario, 24 m, 5-III-68.

Paradyschiria curvata, new species

(Fig. 49C)

This species is most similar to *Paradyschiria parvula* Falcoz and *P. parvuloides* Wenzel. The females resemble those of *parvuloides* in the shape and chaetotaxy of the seventh sternites (see key above) but in *curvata* these possess only one (rarely two) spinelike setae on distal margin. The supra-anal plate is much longer than in any other species. This elongation may be correlated with the remarkable internal scooplike extension of the ventral arc (see description and key), which is unique among these species. In females of the other *Paradyschiria*, the ventral arc does have a ventrally directed, posteriorly concave, lobelike flange whose length varies according to the species, but this does not project anteriorly and then descend to recurve posteriorly as a scooplike structure. The strongly curved postgonites of the male are unique among the known species of the genus.

DESCRIPTION

Generally resembles the characters of *parvula* and *parvuloides* and, like them, usually has a short seta lateral and slightly anterior to the posterior mesonotal macroseta. Posterior margins of lateral lobes of tergum 1+2 in both sexes generally with 2 macrosetae that are distinctly longer than the others, but all less pronounced in the male. Distinctive characters as follows: MALE: Postgonites strongly bent, sickleshaped. Apex of aedeagus hastate. FEMALE: Supra-anal plate markedly longer than broad, the sides subparallel, anterior margin broadly rounded; chaetotaxy as in *parvula* and *parvuloides*, i.e., with 4 distal macrosetae, a short subapical seta on lateral margin and a pair of short, widely separated discal setae near apex. Seventh sternites roughly oval, transverse, with well-developed distal flanges; each usually with about 6 setae on outer and distal margins, including a macroseta near lateral margin, the other 5 much shorter, 1 or 2 of those near inner margin spinelike; a pair of macrosetae present behind these; posterior half of sternite with 8-10 shorter setae of varying lengths. Ventral arc with a broad lobe which extends anteriorly and then descends and recurves posteriorly, its posterior face concave, the whole structure resembling a curved scoop.

MEASUREMENTS

	Males	Females
BL	1.48-1.72	1.45-1.91
TL	0.36-0.37	0.33-0.40

TYPE DATA: Male holotype and female allotype ex *Noctilio labialis* (SVP 5689), Venezuela, Apure, 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 15-XII-65. PARATYPES—APURE: 118 males and 95 females, same data as holotype but 14-28-XII-65; 6 females ex *Noctilio labialis*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 24-XII-65; 7 males and 4 females, same host, Pto. Páez, 76 m, 17-I-66. BOLÍVAR: 1 male ex *Noctilio labialis*, 47 km ESE Caicara, Hato La Florida, 50 m, 50-V-67.

OTHER VENEZUELAN MATERIAL EXAMINED

APURE: 1 male ex 1 *Trachops cirrhosus*, 32 km NE Pto. Paez, La Villa, Hato Cariben, 76 m, 24-XII-65; 1 male and 1 female ex *Molossus ater*, Pto. Páez, 76 m, 17-I-66; 1 female ex 1 *Desmodus rotundus*, 1 male ex *Molossus ater*, 2 sex undet.

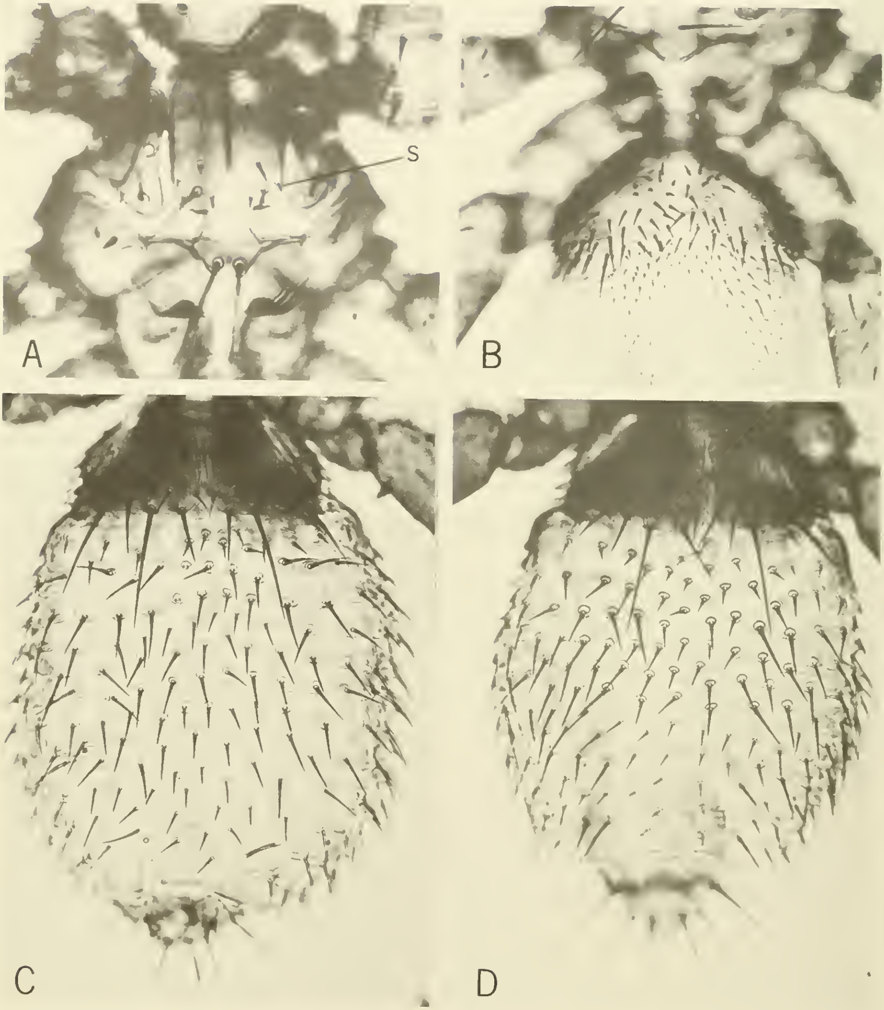

Fig. 47. A-B, *Paradyschiria parvuloides* Wenzel, male: A, thorax, dorsal view (*s* = seta anterolateral to posterior mesonotal macrosetae); B, base of abdomen and thorax. C, *Paradyschiria fusca* (Speiser) (Trinidad), and D, *Paradyschiria lineata* (Kessel) (Panama): dorsal view, female abdomen. From Wenzel et al. (1966).

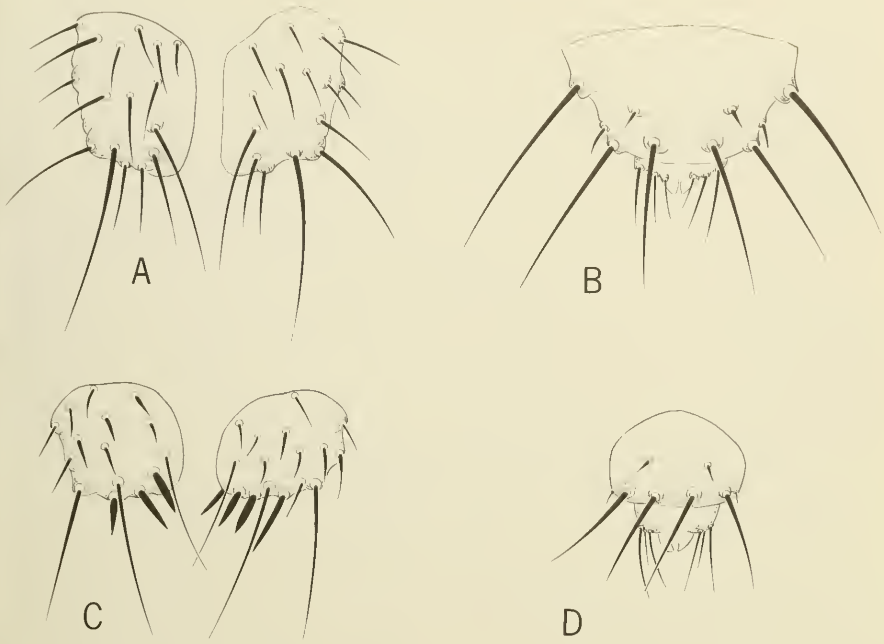

Fig. 48. A-B, *Paradyschiria lineata* Kessel, female: A, seventh sternites; B, supra-anal plate. C-D, *Paradyschiria parvuloides* Wenzel, female: C, seventh sternites; D, supra-anal plate. From Wenzel et al. (1966).

ex *Noctilio labialis*, same data as the holotype but 14-28-XII-65.

REMARKS

This unusual species, which appears to be restricted to *Noctilio labialis*, is known to me only from Venezuelan collections. Its limited distribution in relation to the other species of the genus that occur on *N. labialis* is interesting.

Paradyschiria fusca Speiser

(Fig. 47C)

Paradyschiria fusca Speiser, 1900:56, Pl. 3, Fig. 1.—Wenzel, Tipton, and Kiewlicz, 1966:573, Fig. 110C, 111B.

Paradyschiria dubia Rudow of Guimarães, 1941: 217, Fig. 1-4, misident.

VENEZUELAN SURVEY RECORDS (84 males, 111 females ex 17 *Noctilio leporinus*)

BOLÍVAR: 1 male, 47 km ESE Caicara, Hato La Florida, 50 m, 4-V-67; 35 males and 47 females, 50 km SE El Manteco, Río Supamo, 150 m, 8-10-IV-66.

MIRANDA: 2 males and 5 females, 1 km S Río Chico, 1 m, 5-XI-66; 1 male and 2 females, 5 km E Río Chico, nr. Pto. Tuy, 1 m, 21-XI-66; 7 males and 9 females, 7 km E Río Chico, nr. Pto. Tuy, 1 m, 5-XI-66.

MONAGAS: 2 males and 16 females, 55 km SSE Maturín, Hato Mata de Bejuco, 18 m, 3-VI-68.

T. F. AMAZONAS: 31 males and 21 females, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 12-I–2-II-67; 4 males and 6 females, 84 km SSE Esmeralda, 10 km up Río Mavaca, Boca Mavaca, 138 m, 20-III-67; 2 females, 84 km SSE Esmeralda, 7 km up Río Mavaca, Boca Mavaca, 138 m, 2-III-67; 1 male and 2 females, 84 km SSE Esmeralda, 9 km up Río Mavaca, Boca Mavaca, 138 m, 10-III-67; 1 female, 108 km SSE Esmeralda, Río Mavaca, 140 m, 5-IV-67.

OTHER VENEZUELAN MATERIAL EXAMINED

MIRANDA: 1 female ex *Noctilio labialis*, km 125, Caracas-Higuerate Rd., 30-VIII-62, T. Cobo.

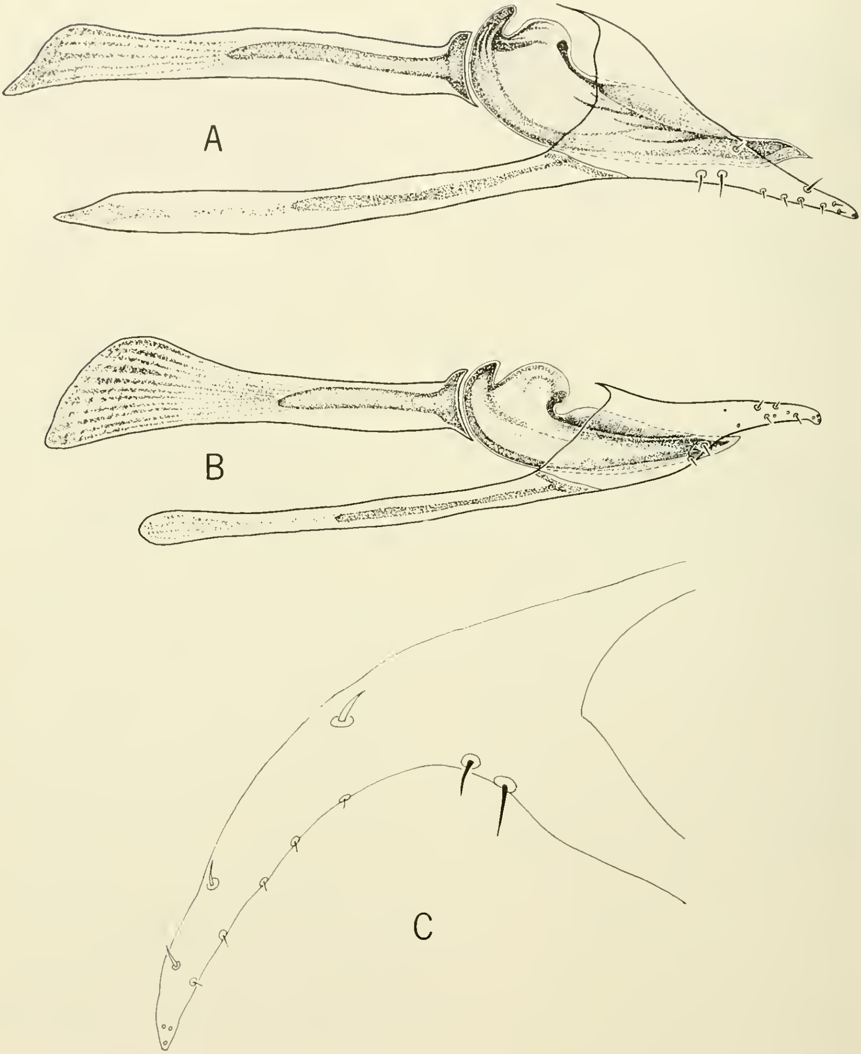

Fig. 49. A-B, male aedeagus and postgonites: A, *Paradyschiria lineata* Kessel; B, *Paradyschiria parvuloides* Wenzel. C, *Paradyschiria curvata*, new species (SVP 5684): right male postgonites. A-B from Wenzel et al. (1966).

HOST ASSOCIATIONS

All of the survey collections and all other reliable records that I know of for this species are from *Noctilio leporinus.* The single specimen from *N. labialis* may be a contaminant.

Paradyschiria lineata Kessel
(Fig. 47D, 48A-B, 49A)

Paradyschiria lineata Kessel, 1925:27.—Wenzel, Tipton, and Kiewliez, 1966:574, Fig. 110A-B, 111A.

VENEZUELAN SURVEY RECORDS (174 males, 157 females)

CARABOBO: 13 males and 9 females ex *Noctilio leporinus,* 10 km NW Urama, El Central, Urama, 25 m, 23-III-66.

GUÁRICO: 4 males and 3 females ex *Noctilio leporinus,* 35 km SSW San Juan de los Morros, Hto. Las Palmitas, 181 m, 4-IX-66.

YARACUY: 1 male ex 1 *Noctilio labialis,* 128 males and 118 females ex *Noctilio leporinus,* 10 km NW Urama, El Central, Urama, 25 m, 8-14-III-66; 1 male and 3 females, same host, 1 male ex 1 *Pteronotus parnellii,* 11 km NW Urama, El Central, Urama, 25 m, 14-III-66.

ZULIA: 20 males and 18 females ex *Noctilio leporinus,* 42 km WNW Encontrados, El Rosario, 24 m, 24-II–3-IV-68; 6 males and 6 females, same host, 33 km NW La Paz, nr. Cerro Azul, 75 m, 15-VI-68.

HOST ASSOCIATIONS

Of 231 specimens of *Paradyschiria lineata* that were collected by the survey teams, 229 (99 percent) were collected from 37 *Noctilio leporinus.* The single specimen reported from two other hosts probably represent contamination or misassociation.

REMARKS

Paradyschiria lineata is very similar to *P. fusca.* Its easternmost distribution is contiguous with that of *fusca,* and it may be that the two are geographic "races" of a single species.

Genus *Speiseria* Kessel

Speiseria Kessel, 1925:19

TYPE SPECIES: *Speiseria ambigua* Kessel, 1925:20

This previously monotypic genus proves to be a group of at least four or more species. Study of the Venezuelan collections disclosed the existence there of three very similar species of *Speiseria*: *S. ambigua,* a characteristic parasite on *Carollia perspicillata; S. peytoni* n. sp. on *C. subrufa;* and *S. magnioculus* n. sp. on *Trachops cirrhosus.* In the collection of Field Museum there is a fourth (undescribed) species taken from *Natalus stramineus mexicanus* in Guatemala. Further, two males which Wenzel et al. (1966:550) recorded from Panama as *S. ambigua* from *Glossophaga soricina leachii* may also be distinct. These have very small eyes with only six facets, the central ommatidia being absent. The postgonites of these are very similar to those of specimens taken in Panama from *C. brevicauda* (see remarks under *S. peytoni*).

The species of *Speiseria* are remarkably similar in appearance to two new species of the *Trichobius phyllostomae* group (q.v.) *T. petersoni* n. sp. and *T. hispidus* n. sp. The head of these two species of *Trichobius* is also remarkably similar to that of *Speiseria* in the shape of the occipital plates and the long erect macrosetae inserted on tubercles. The strong anterior projection of the mesosternum and the greatly elongated hindlegs enhance the resemblance, so much so that I briefly considered placing *Speiseria* as a synonym of *Trichobius* and assigning the species to the *T. phyllostomae* group. However, a careful analysis of these taxa reveals many differences. These are listed in Table 1.

A number of the characters by which the species of *Speiseria* differ from the two new species of the *T. phyllostomae* group are shared with *Pseudostrebla ribeiroi* Lima and some other species of *Pseudostrebla.* In Table 1, these characters are preceded by an asterisk. Some of these are also shared by *Parastrebla* and *Stizostrebla.*

Except for its somewhat broader and flatter head, its shorter hindlegs, and very long metatibial macrosetae, *P. ribeiroi* proves to be remarkably similar to species of *Speiseria,* with only minor exceptions. In *Pseudostrebla* (and *Stizostrebla*) the occipital lobes appear to be contiguous at midline (they nearly meet in *Speiseria*), each laterovertex is divided by an oblique basolateral, dark line, and the palpi are even more strongly transverse than in *S. magnioculus.* These differences may well be correlated with the broadening and flattening of the head. The dorsum of the head of *Speiseria* species is most like that of *Parastrebla handleyi,* in which the occipital lobes are separated.

It appears that the extraordinary similarity between species of *Speiseria* and *T. petersoni* and *hispidus* is a remarkable convergence, and that *Speiseria* is probably best placed near *Pseudostrebla* and *Parastrebla.*

In all females of *Speiseria*, the ventral connexivum has at least one, and sometimes a second, less well-defined row of longer, conspicuously stronger, curved setae anterior to the seventh sternites. The location and appearance of these setae suggest that they are homologous with the curved blunt setae found in females of *Parastrebla*.

Key to Species of *Speiseria*

1. Eyes usually with 11-12 (rarely 9) facets, usually widest (deepest) anteriorly, viewed from the sides; palpi nearly transverse; theca with ± 24 setae. Setae on posterior margin of sternum 2 subequal in length and coarseness, those toward the sides not coarser or shorter. Female. Tergum 7 widest at base, distinctly constricted near midlength. Male. Sternum 7+8 with 13-14, tergum 9 with 11-12 setae. .... *magnioculus* n. sp.

   Eyes usually with 9 facets, widest (deepest) at midlength. Palpi elongate-oval, oblique, not transverse; theca with ± 18 setae. Setae along median portion of posterior margin of sternum 2 distinctly finer and longer than those toward sides. Female. Tergum 7 widest distally or parallel-sided, not constricted at midlength. Male. Sternum 7+8 with 4-6, tergum 9 with 9-10 setae. 2

2. Female. Tergum 7 elongate, usually with subparallel sides and distinctly longer than supra-anal plate and cerci combined. Male. Apices of postgonites strongly curved (Fig. 50C) .... *ambigua* Kessel

   Female. Tergum 7 usually more oval, sides distinctly converging anteriorly, not longer than supra-anal plate and cerci combined. Male. Postgonites nearly straight, apices feebly curved (Fig. 52B) .... *peytoni* n. sp.

Table 1. Differences between species of *Speiseria* and *Trichobius petersoni* n. sp. and *T. hispidus* n. sp. (*T. phyllostomae* group)

Species of *Speiseria*	*Trichobius petersoni* and *hispidus* n. sp. (*T. phyllostomae* group)
Eyes with 9-12 facets.	Eyes with 25-36 facets.
°Palpi transverse (in *magnioculus* only).	Palpi nearly transverse (in *T. petersoni* only)
°Underside of head funnel-shaped, compressed behind the oral cavity, the compressed portion terminating in a knob-like lobe; median postoral area bare and bounded by macrosetae in two longitudinal rows.	Underside of head not strongly compressed, the area behind the oral cavity rounded, with two or more transverse rows of short setae.
°Anterior margin of thorax rather conspicuously excavated on each side for the reception of the occipital lobes.	Anterior margin of thorax sinuate, at most feebly excavated for reception of occipital lobes.
°Intercoxal mesosternal projection longer, sides of mesosternum rather obtusely margined from the posterior margin of mesocoxa nearly to metacoxa.	Intercoxal projection shorter, sides of mesosternum posterior to procoxae, not noticeably margined.
°Metasternal lobe absent.	Metasternal lobe long, pointed, dorsally reflexed, extending about halfway to metepimeron.

*Sixth longitudinal wing vein with macrosetae at basal angle.	Sixth longitudinal wing vein lacking setae at or near basal angle.
*Pro- and mesotibiae with macrosetae. Dorsal edge of metatibiae with a few scattered erect or semierect distinctly longer setae. Last tarsal segment of hindlegs strongly laterally compressed, scarcely wider than the other segments.	Pro- and mesotibiae lacking macrosetae. Metatibiae with uniformly short setae. Last segment of hind tarsi not laterally compressed, about twice as broad as other segments.
*FEMALE. Tergum 7 elongate, at least twice as long as wide, conspicuously narrower than supra-anal plate, typically with two pairs of distal setae, the anterior pair longest.	FEMALE. Tergum 7 very short, transverse, nearly as wide as supra-anal plate, with a long macroseta near outer edge on each side, and a pair of shorter setae medial to these.
*Cerci free.	Cerci fused with ventral arc.
*A pregenital sclerite present.	Pregenital sclerite lacking.
*A postgenital sclerite absent.[8]	Postgenital sclerite present.
*MALE. Postgonites symmetrical both in shape and insertion of ventral setae; accessory setae inserted anterior to macrosetae.	MALE. Postgonites asymmetrical both in shape and in insertion of ventral setae; accessory setae inserted posterior to macrosetae.

*Characters shared by species of *Speiseria* and species of *Pseudostrebla* (especially *P. ribeiroi*)

Speiseria ambigua Kessel
(Fig. 50)

Speiseria ambigua Kessel, 1925:20, Pl. 1, Fig. 1-2.—Wenzel, Tipton, and Kiewlicz, 1966: 549, Fig. 102A-C

Synthesiostrebla amorphochili, Jobling, 1939a: 488, Fig. 1A-C, not Townsend

Paratrichobius anduzei Matheson, 1945:191, Fig. 1A-E

The discovery of several new species of *Speiseria*, all extraordinary similar to *S. ambigua* Kessel, raises a question as to the identity of *ambigua*. Unfortunately, I have not had an opportunity to examine Kessel's type, from "*Vampyrus*" from Pernambuco, Brazil. While it could prove to be the same as one of the new species described below, it is most likely the characteristic parasite of *Carollia perspicillata*. *Carollia brevicauda*, the host of *S. peytoni* n. sp., apparently does not occur in the northeast or south of Brazil (Pine, 1972). Thus, *ambigua* is not apt to be identical with *peytoni*.

It seems unlikely that it is the same as *S. magnioculus*, either, because that species appears to be uncommon even on its characteristic host, *Trachops cirrhosus*. Of the 362 specimens of this bat collected on the survey, only about 10 percent were parasitized by this fly.

Through the courtesy of Dr. L. L. Pechuman, I have been able to reexamine the female type and the two male paratypes of *Paratrichobius anduzei* Matheson, from "San Esteban," Venezuela. The eyes, male postgonites, and other characters are clearly those of *S. ambigua*, as interpreted by me.

VENEZUELAN SURVEY RECORDS (188 males, 98 females, 2 sex undet.)

Speiseria ambigua is such a characteristic parasite of the extraordinarily ubiquitous host, *Carollia perspicillata*, that there is little point in giving detailed distribution records. To briefly summarize, the survey teams collected this fly at 59 localities in 13 states, as follows: Apure (1 locality, 24 m); Barinas (2 localities, 619-794 m); Bolívar (8 localities, 150-916 m); Carabobo (5 localities, 25-1,537 m); Falcón (5 localities, 2-250 m); Guárico (2 localities, 470-630 m); Miranda (5 localities, 1-1,160 m); Monagas (3

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[8] Wenzel et al. (1966:549) erred in stating that (1) a postgenital sclerite was present in females of *Speiseria* and that (2) the cerci were fused to the ventral arc. The subgenital sclerite that is present is anterior, not posterior, to the vulva. The female cerci are free.

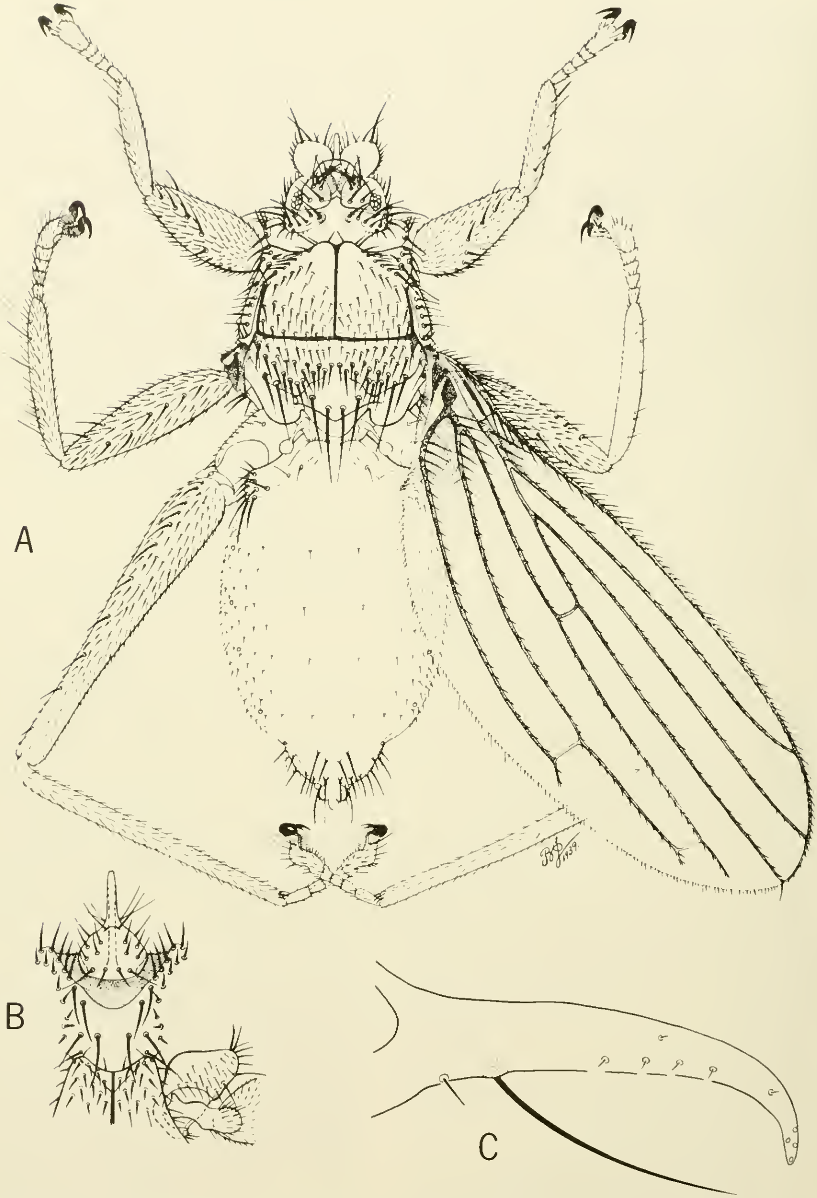

Fig. 50. *Speiseria ambigua* Kessel: A, female, dorsal view: B, posterior margin of head and anterior portion of mesosternum: C, left male postgonites. A-B from Jobling (1939); C from Wenzel et al. (1966).

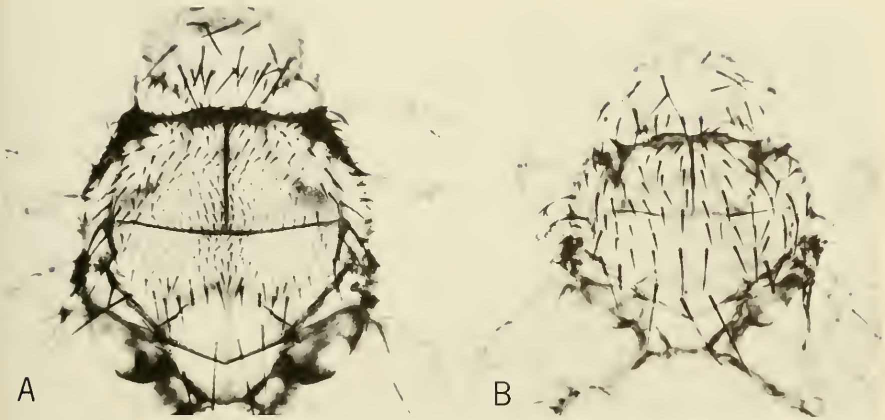

Fig. 51. A, *Parastrebla handleyi*: dorsal view of thorax, male (SVP 7573). B, *Pseudostrebla sparsisetis*, new species: dorsal view of thorax, male (FMNH 88081).

localities, 854-1,170 m); Sucre (5 localities, 2-380 m); T. F. Amazonas (9 localities, 114-161 m); Trujillo (3 localities, 90-164 m); Yaracuy (2 localities, 25-37 m); Zulia (9 localities, 37-270 m).

Host Associations

Of 288 specimens of *Speiseria ambigua* collected by the survey teams, 277 (96 percent) were from 220 *Carollia perspicillata*. The remaining 11 were from 9 bats from 6 different species.

Speiseria peytoni, new species
(Fig. 52B)

Agreeing with *Speiseria ambigua* in virtually all of its characters, but usually lightly rather than darkly-stramineous in color, with slightly less elongate palpi, slightly shorter mesonotum, generally more slender setae, and seventh tergum generally more teardrop shaped (sometimes with subparallel sides). Easily identifiable only by the male postgonites which are nearly straight rather than strongly curved distally. The characters given in the key for separating females from *ambigua* vary greatly and cannot be relied upon for positive identification.

Description

General form, chaetotaxy, and structure as in *Speiseria ambigua*, but smaller, paler, and with generally weaker setae. *Head.* Eyes with 9 facets, oval, widest (deepest) at midlength, distinctly shorter than greatest width of a laterovertex. Palpi oval-ablique, not strongly transverse, ventral face and margins with ± 40 short setae in addition to the longer marginals. Theca with 8-10 setae on each side. *Abdomen.* Female. Tergum 7 about as long as supra-anal plate (with which it is united) and cerci combined, its sides feebly but distinctly converging anteriorly; with the usual pair of strong macrosetae, and distal to these a pair of shorter, strong setae near apex. Supra-anal plate, as usual in *Speiseria*, with 4 slender macrosetae, the median pair displaced anteriorly and lateral to these a single short seta near each side. Setae along apical margin of sternum 2 distinctly more slender and slightly longer along middle, becoming conspicuously stouter and slightly shorter laterad. Ventral abdominal connexivum just anterior to seventh sternites, with a row of ± 10 curved setae which are distinctly stronger and a little longer than those anterior to them. Seventh sternites with 16-17 setae. Male. Sternum 7+8 with a row of 4-5 setae, including a conspicuously longer macroseta dorsally and a shorter seta medial to it, the others usually becoming shorter lateroventrally; and distal to and removed from these is usually an additional seta of variable length. Tergum 9 with ± 10 setae consisting of an anterodorsal row of 3 macrosetae and a posterior row of 5 other setae of which the most dorsal ones are longer, the others short. Postgonites slender, nearly straight, feebly curved distally.

MEASUREMENTS

	Males	Females
BL	1.69-2.19	2.48-2.60
TL	0.71-0.78	0.79-0.86
WL	1.94-1.98	2.14-2.23
WW	0.82-0.88	0.90-0.96

TYPE DATA: Male holotype and female allotype ex *Carollia brevicauda* (SVP 33097), Venezuela, Carabobo, 4 km NW Montalbán, La Copa, 1,537 m, 29-XI-67. PARATYPES—APURE: 1 male ex *Carollia brevicauda*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 22-I-68. BARINAS: 5 males and 1 female ex *Carollia brevicauda*, 1 km SW Altamira, Altamira, 794 m, 13-14-XII-67; 18 males and 14 females, 2 km SW Altamira, Altamira, 609-794 m, 27-XII-67—4-I-68; 2 males, same host, 5 km SW Altamira, Altamira, 794 m, 13-XII-67; 2 males and 2 females, same host, 7 km NNE Altamira, Altamira, 1,070 m, 25-XII-67; 12 males and 7 females, same host, Altamira, 794 m, 14-XII-67—9-I-68. BOLÍVAR: 1 male ex *Carollia brevicauda*, 85 km SSE El Dorado, Km 125, 1,032 m, 10-V-66. CARABOBO: 2 males ex *Carollia brevicauda*, 13.5 km NE Montalbán, La Voluntad, Montalbán, 1,007 m, 2-XI-67; 3 males and 2 females, same host, 3 km SW Montalbán, Hda. La Canada, Montalbán, 618 m, 22-XI-67; 1 male, same host, 3 km W Montalbán, Le Leonera, Montalbán, 900 m, 23-XI-67; 1 male and 3 females, same host, 9 km NE Montalbán, Cumbre Canoabo, Montalbán, 657-752 m, 1-XI-67; 7 males and 2 females, same locality data as the holotype but 26-29-XI-67. DTO. FEDERAL: 1 female ex *Carollia brevicauda*, 4 km NNW Caracas, Los Venados, 1,487 m, 15-VIII-65. MIRANDA: 3 males and 3 females ex *Carollia brevicauda*, 5 km NNW Guarenas, Curupao, 1,160 m, 5-11-X-66.

OTHER MATERIAL EXAMINED

COLOMBIA: Antioquia, 1 male, host undet. (Marinkelle 4899), Chigorado, 6-IV-66, C. J. Marinkelle; Putomayo, 1 male ex *Artibeus lituratus*, Pto. Asis, IX-65, C. J. Marinkelle.

HOST ASSOCIATIONS

All of the 95 specimens of *Speiseria peytoni* were from 74 *Carollia brevicauda*, and all but one were from bats collected above 600 meters elevation.

REMARKS

A collection from one specimen of *Carollia brevicauda* (SVP 32868) contained a male each of *Speiseria peytoni* n. sp. and *S. ambigua*. Specimens of *C. perspicillata* were collected at the same locality on the same data. Thus, the specimen of *S. ambigua* could be a contaminant.

Specimens which Wenzel et al. (1966:550) recorded as *S. ambigua* from Panamanian specimens of *C. "subrufa"* (*brevicauda*, fide Pine, 1972:36) and of *C. castanea* are very similar to *S. peytoni*, but the males have slightly more strongly curved postgonites.

This species is named for Patricia Peyton Johnson, secretary of the Department of Zoology at Field Museum, in grateful appreciation of her dedicated assistance in collating the large volume of data reported herein, in typing most of

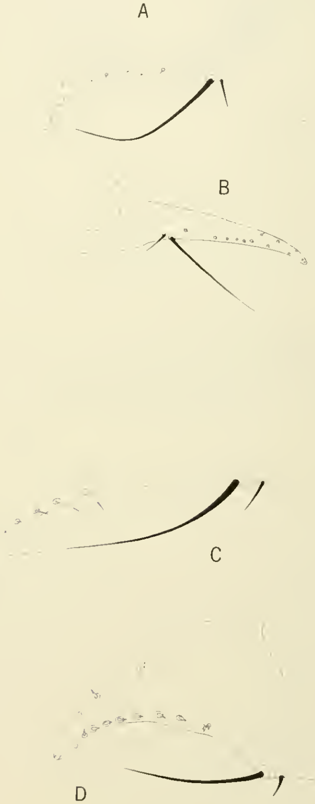

Fig. 52. Male postgonites: A, *Speiseria magnioculus*, new species; B, *Speiseria peytoni*, new species (holotype); C, *Parastrebla handleyi* Wenzel (SVP 17454); D, *Pseudostrebla sparsisetis*, new species (SVP 88081).

the manuscript, and in assisting in many other ways over a period of several years.

Speiseria magnioculus, new species
(Fig. 52A)

Speiseria magnioculus differs from both *S. ambigua* Kessel and *S. peytoni* n. sp. in (1) its generally larger eyes, which have 11-12 (rarely 9) facets and are widest (deepest) anteriorly rather than at midlength (viewed from the side), and whose length is nearly equal to greatest width of a laterovertex, rather than distinctly shorter; (2) the nearly transverse palpi, which are densely setose below, having ± 60 short setae on ventral face and margins; (3) the large female tergum 7, which is widest posteriorly and distinctly constricted along midlength; (4) the more numerous setae (± 13-14) on male sternum 7+8 and on tergum 9 (11-12), as opposed to 4-5 on sternum 7+8 and 9-10 on tergum 9 in *ambigua* and *peytoni*. In general, *magnioculus* is a larger species with somewhat broader and more flattened head.

Description

A larger species with form, structure, and chaetotaxy generally as in *ambigua*, but distinctive as follows. *Head.* Somewhat broader and more flattened than in *ambigua;* palpi rather strongly transverse, their ventral face densely setose, with ± 60 short setae on face and margin in addition to the longer marginal setae; theca with ± 12 setae on each side (8-10 in *ambigua*). *Abdomen.* Setae along apical margin of sternum 2 slender, of nearly uniform thickness and length, those toward sides only very slightly coarser. Female. Tergum 7 large, distinctly longer than supra-anal plate and cerci combined, widest at base, distinctly constricted along midlength. Seventh sternites with ± 15 setae. Male. Sternum 7+8 with 13-14 setae, including 2-4 fairly long, thin setae dorsomedially and 2 macrosetae lateral to these, one of them conspicuously longer; ventral to these is a group of about 7 shorter setae and 2 other setae posterior to them. Tergum 9 with 11-12 setae, including 2-3 macrosetae, the others shorter, of varying lengths. Postgonites as in *ambigua*, their apices strongly curved.

Measurements

	Males	Females
BL	2.36-2.51	2.55-2.83
TL	0.83-0.90	0.92-0.96
WL	2.08-2.20	2.30-2.38
WW	0.95-1.04	1.03-1.07

Type Data: Male holotype and female allotype ex *Trachops cirrhosus* (SVP 17454), Venezuela, T. F. Amazonas, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-IV-67. Paratypes—VENEZUELA. Bolívar: 1 male and 1 female ex *Trachops cirrhosus*, 59 km SE El Dorado, km 74, El Manaco, 150 m, 14-VI-66; 1 male and 1 female, same host, 20 km W La Paragua, Hato San José, 306 m, 6-III–10-IV-67: T. F. Amazonas: 1 male ex *Trachops cirrhosus*, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 8-VIII-67; 10 males and 3 females, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 5-27-VII-67; 23 males and 15 females, same locality data as the holotype but 3-14-IV-67.

Host Associations

All of the 48 specimens of *Speiseria magnioculus* collected by the survey teams were taken from 34 *Trachops cirrhosus.* Interestingly, S. *magnioculus* does not appear to occur on that host in Panama.

The specimens (two records) reported from *T. cirrhosus* by Wenzel et al. (1966:551) have been reexamined and their identity as *S. ambigua* confirmed.

Genus *Parastrebla* Wenzel

Parastrebla Wenzel, 1966:578
Type Species: *Parastrebla handleyi* Wenzel, 1966:579

Parastrebla handleyi Wenzel
(Fig. 51A, 52C)

Parastrebla handleyi Wenzel, 1966:579, Fig. 116

The monotypic genus *Parastrebla* was based on a single female specimen from Panama. We can now add a description of the male.

Description

Male. Similar to the female in chaetotaxy of head, thorax, and legs. Sternum 2 and abdominal connexivum also very similar, but ventral connexivum lacking the transverse subapical row of coarser setae. Sternum 5 very broad, well developed, and covered with setae much like those of the connexivum but becoming very slightly longer distally; apical margin with ± 16 long setae, of which ± 12 are very long macrosetae. Sternum 6 absent. Hypopygium a rather broad cone.

Sternum 7+8 clothed with numerous setae of moderate length; 2 macrosetae on each side, one of these near inner margin, 1 on lateral margin. Dorsodistal margin of tergum 9 with ± 6 conspicuously longer macrosetae, and a row of macrosetae along lateral-disto margin which became shorter ventrally; anterior to these is an irregular double row of short setae. Postgonites (Fig. 52C) stout, bladelike, curved, apices slightly hooked; each with a ventrolateral submarginal row of setae on a little less than distal half; ventral macrosetae inserted distal to shorter accessory setae, both pairs situated far posteriorly.

MEASUREMENTS

	Males	Females
BL	1.77-2.31	1.99-2.70
TL	0.59-0.81	0.59-0.83
WL	1.20-1.87	1.25-1.91
WW	0.76-0.96	0.73-0.93

VENEZUELAN SURVEY RECORDS (7 males and 5 females ex 7 *Micronycteris nicefori*)

BOLÍVAR: 7 males and 5 females, 28 km SE El Manteco, Los Patos, 150 m, 5-IV-66.

OTHER MATERIAL EXAMINED

BRAZIL. PARATYPE: 1 male and 1 female ex *Micronycteris* sp., Mananna, Utuza Forest, 1-XI-67, Thomas H. G. Aitken.

Genus *Pseudostrebla* Lima

Pseudostrebla Lima, 1921:23

TYPE SPECIES: Pseudostrebla ribeiroi Lima, 1921:23

The species of *Pseudostrebla* occur on bats of the genus *Tonatia*: *P. ribeiroi* Lima on *T. silvicola; P. greenwelli* Wenzel on *T. minuta;* and *P. sparsisetis* n. sp. on *T. carrikeri.* In the collection of Field Museum there are specimens of another undescribed species taken in Peru (Cuzco: Huajyumbe) from *T. venezuelae.*

Key to the Species of *Pseudostrebla*

1. Only 2 rows of setae, including the row of long antescutellars, between the scutellum and the transverse mesonotal suture. Costal vein with 2 conspicuous macrosetae which are twice as long as the others, 1 situated at the humeral crossvein, the other distal to it. MALE. Postgonites very short and strongly bent apically; with a ventral row of thornlike setae (Fig. 52D) .... *sparsisetis* n. sp.

   At least 3 rows of setae present between the scutellum and the transverse mesonotal suture. Costal vein without conspicuously longer macrosetae at or beyond the humeral crossvein (though 1 may be present on basicosta). Postgonites as in Fig. 53A, B 2

2. Mesonotal setae rather uniformly distributed on scutum and prescutum. Setae at base of sixth wing vein only a little longer than those following. Hind tibiae scarcely longer than tarsi, with 5 very long macrosetae (Fig. 53C) .... *greenwelli* Wenzel

   Mesonotal setae somewhat denser on scutum than on prescutum. Base of sixth wing vein with several moderately long macrosetae. Hind tibiae about ⅓ again as long as tarsi, with 6 macrosetae (Fig. 53D) .... *ribeiroi* Lima

Pseudostrebla sparsisetis, new species
(Fig. 51B, 52D)

Pseudostrebla sparsisetis is a small species, like *P. greenwelli* Wenzel. It is easily distinguished from that species and from *P. ribeiroi* by the two very long conspicuous erect macrosetae on the costal vein, the sparsely and rather uniformly setose mesonotum, the four (rather than five or six) macrosetae on hind tibiae, and the very short, strongly bent male postgonites with short thornlike setae on their ventral margins.

DESCRIPTION

Head. Broad, broadly emarginate behind to accommodate the median anterior projection of the prescutum; laterovertices large, transverse, each with about 4 strong longer setae and 3 short ones, 1 strong seta present in the posterior division above the eye. Occipital lobes each with about 10 setae, those on inner half not quite as long as the others, lobes very narrowly separated at middle. Eyes each with about 10 facets. Palpi transverse, anterior margin emarginate near outer edge, with about 3 much longer setae and about 5 shorter ones; ventral face rather evenly covered with short setae and 1 longer one near inner apical margin. Theca broadly pyriform. Underside of head broadly funnel shaped, terminating posteriorly in a short knoblike lobe; area immediately behind the oral cavity bare, this area bounded by setae of varying sizes. *Thorax.* Transverse, mesonotum markedly broader than long; anterior margin with a bilobed median projection, this not as strong as in *riberoi* or *greenwelli;* margin excavated on each side of the projection for the reception of the occipital lobes. Median suture extending to the transverse suture, the latter indistinct on about middle third of its width; prescutum rather evenly, sparsely covered with setae of moderate length, some of those in the anterior angles distinctly longer, at least 1 along the basolateral angle. Scutum with similar discal setae and a row of 7 or 8 conspicuously longer setae in front of the scutellum; with only 2 transverse rows of discal setae immediately in front of the middle of the scutellum. Scutellum with 4 setae. Mesosternum strongly projecting between the coxae, anterior margin deeply, angulately emarginate; mesometasternum rather evenly covered with setae, these becoming slightly longer distally; mesosternum with conspicuously longer setae medial to coxae as well as a group of longer setae on outer edge. Metasternum slightly emarginate along apex; lateral margins with 9 or 10 longer setae on each side, including 2 or more distinctly longer macrosetae; disc also with at least 1 macroseta on each side inward from coxae. *Wings.* Costa with: a ventral row of setae that are distinctly longer than short dorsal setae of other veins; a marginal fringing row of much longer and stronger setae, the basal ones macrosetae, and a row of much coarser, sparser dorsally inserted setae, which, like the fringing setae, become shorter and much finer distally; and 2 extraordinarily long macrosetae, 1 inserted opposite humeral vein, the other distal to it. *R* and bases of *rs*, and third to fifth longitudinal veins bare excepting as follows: *R* with another unusually long macroseta similar to the 2 on costa, and 2 much shorter, fairly strong setae; stalk of the fourth and fifth longitudinal vein and base of fifth with a row of 3-4 strong macrosetae, basal angle of sixth with 2. *Legs.* Protibiae with 4 macrosetae, elsewhere covered with short setae. Mesotibiae with 4 macrosetae and a row of setae along dorsolateral margin, these distinctly longer than the other short tibial setae. Metatibiae with 5 macrosetae and, along outer dorsal edge, a row of somewhat longer setae. Hind tarsi nearly as long as tibiae, the last segment strongly compressed, no wider than the other dorsal segments; first tarsal segment with a couple of pairs of setae that are much stronger and longer than the others, which are mostly minute. Setae of costal margin consisting of a row of very strong long setae and a row of shorter macrosetae, which gradually become shorter to near junction with the first vein, and are uniform from that point to third longitudinal vein; seta at apex of third vein conspicuously longer than the others, nearly as long as the interval between the third and fourth vein; in addition to these there is a row of about 6 other strong and 2 strikingly long macrosetae, one inserted at humeral vein, the other distal to it on costa. Radius with 2 erect macrosetae, 1 much longer than the other. Vein *rs* with only 1 or 2 setae at apex, otherwise bare; third, fourth, and fifth longitudinal veins bare, lacking short setae on a large basal portion, but the fourth with about 3 macrosetae, the sixth with 2. *Abdomen.* Lateral lobes of tergum 1+2 with ± 1 coarse macroseta and a few shorter setae. Sternum 2 with a large triangular setose area which extends to base; ± 20 setae along distal margin conspicuously longer. Dorsolateral abdominal connexival setae longer than ventrals, becoming shorter ventrad; ventral setae distinctly shorter than discal setae on sternum 2, becoming somewhat longer near apex. Venter with the usual pair of segmental macrosetae. Setae of abdomen similar in both sexes but somewhat shorter in the male. FEMALE. Tergum 7 very short, transverse, with a microseta on each side near margin. Supra-anal plate very short, with 4 slender setae. Seventh sternites with ± 11 setae, 4 near apical margin distinctly longer than 4 other macrosetae, remaining setae much shorter. MALE. Sternum 5 covered with short setae similar to those of connexivum, becoming slightly longer distally; apical margin with ± 18 macrosetae most of them nearly as long as the fifth sternum, a couple of them conspicuously longer. Sternum 6 threadlike. Sternum 7+8 on each side with 11-12 setae including 2 conspicuous macrosetae, 2 slender setae medial to them, and posterior to these a group of 7-8 slender setae which are about half as long as the macrosetae. Tergum 9 with 5 macrosetae of varying lengths and distoventral surface with ± 10 setae which are about half as long as the longest macrosetae. Postgonites as in Fig. 52D.

MEASUREMENTS

	Males	Females
BL	1.62-1.73	1.97
TL	0.57-0.59	0.59
WL	1.20-1.21	1.23
WW	0.74-0.77	0.74

TYPE DATA: Male holotype (FMNH 88081) and female allotype (FMNH 87942) ex *Tonatia carrikeri*, Colombia, Meta: Los Micos, San Juan de Aroma, 1,300 ft, 16-IV-57, Kjell Von Sneidern. PARATYPES–COLOMBIA. 2 males (FMNH), same data as the holotype; 4 males (FMNH 87942), same data as the holotype.

VENEZUELA. T. F. AMAZONAS: 1 male (in poor condition) and 1 female (USNM) ex *Tonatia carrikeri*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 10-IV-67.

Pseudostrebla greenwelli Wenzel
(Fig. 53A, C)

Pseudostrebla greenwelli Wenzel, 1966:582, Fig. 118A, C

VENEZUELAN SURVEY RECORDS (1 female ex 1 *Tonatia brasiliensis*)

T. F. AMAZONAS: 1 female, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 27-VII-67.

Pseudostrebla ribeiroi Lima
(Fig. 53B, D; 54)

Pseudostrebla ribeiroi Lima, 1921:23, Pl. 2, Fig. 4.—Wenzel, Tipton, and Kiewlicz, 1966: 582, Fig. 117, 118B, D

VENEZUELAN SURVEY RECORDS (3 females ex 3 *Tonatia silvicola*)

T. F. AMAZONAS: 2 females, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 30-V–12-VI-67; 1 female, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 9-X-67.

Genus *Stizostrebla* Jobling

Stizostrebla Jobling, 1939b:273

TYPE SPECIES: *Stizostrebla longirostris* Jobling, 1939b:273

Stizostrebla longirostris Jobling
(Fig. 55)

Stizostrebla longirostris Jobling, 1939b:273, Fig. 2A-C.—Wenzel, Tipton, and Kiewlicz, 1966: 587, Fig. 119

VENEZUELAN SURVEY RECORDS (3 males, 1 female)

T. F. AMAZONAS: 3 males and 1 female ex 1 *Tonatia carrikeri*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 10-IV-67.

Genus *Strebla* Wiedemann

Strebla Wiedemann, 1824:19.—Wenzel, Tipton, and Kiewliez, 1966:591

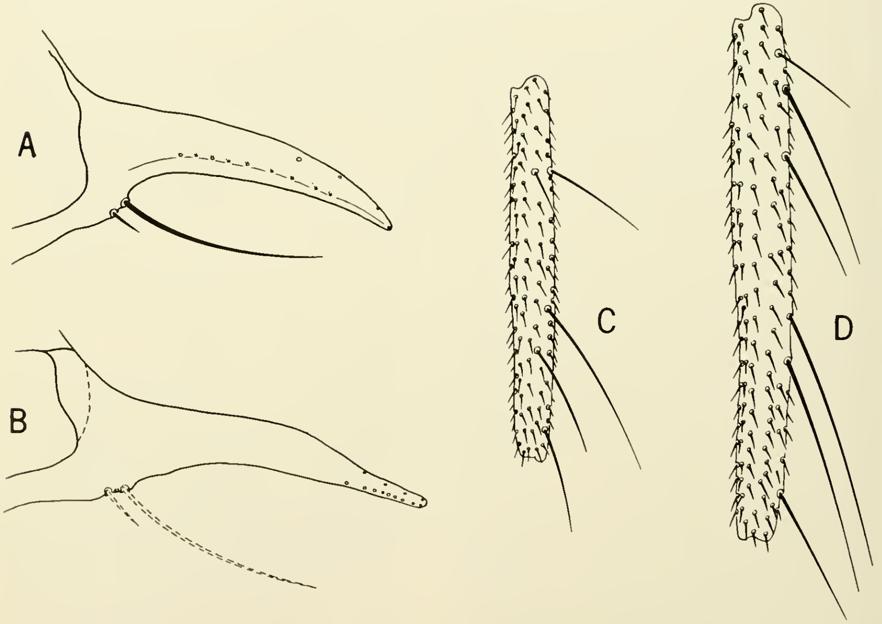

Fig. 53. A, C, *Pseudostrebla greenwelli* Wenzel: A, left male postgonite and C, metatibiae. B, D, *Pseudostrebla ribeiroi* Lima: B, left male postgonite, D, metatibiae. From Wenzel et al. (1966).

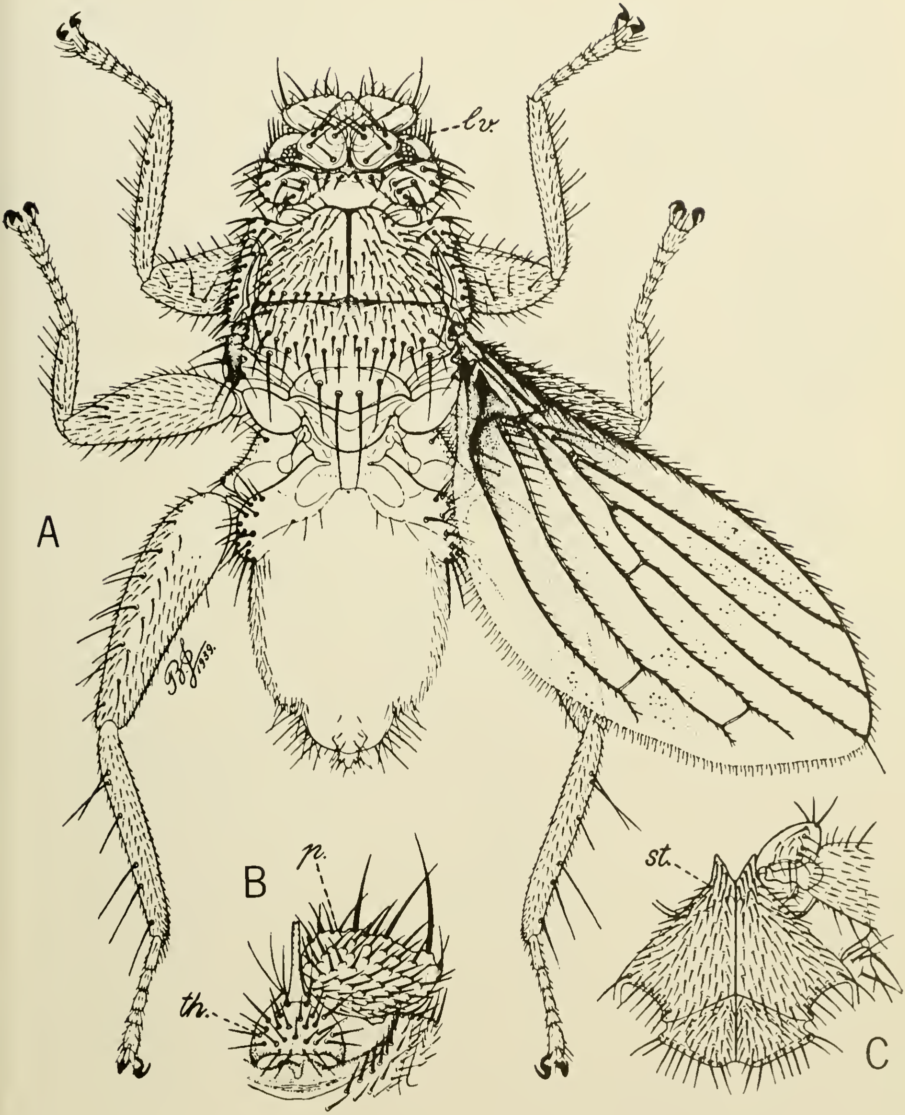

Fig. 54. *Pseudostrebla ribeiroi* Lima: A, female, dorsal view; B, mouthparts; C, meso-metasternum. From Jobling (1949).

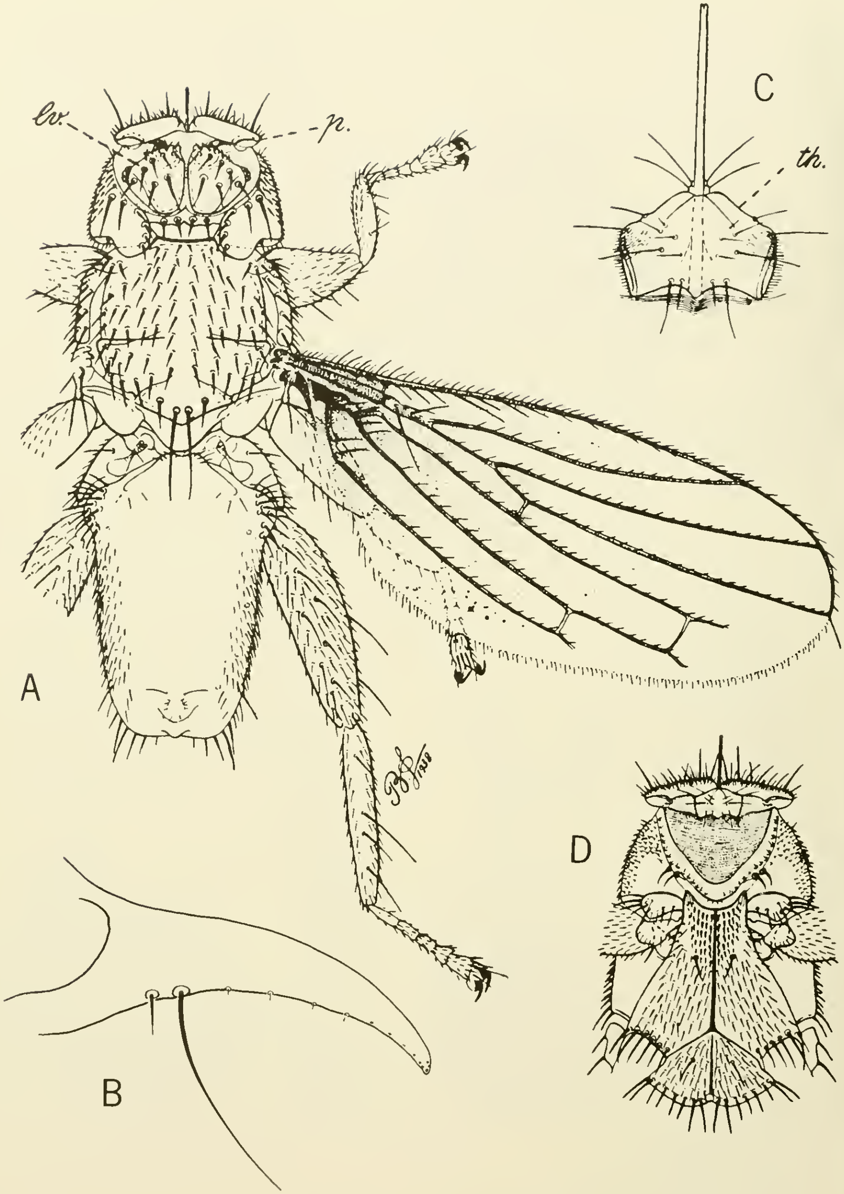

Fig. 55. *Stizostrebla longirostris* Jobling: A, female, dorsal view; B, left male postgonite; C, labium; D, underside of head and thorax. From Jobling (1949).

Type Species: *Strebla wiedemanni* Kolenati, 1856:46 (nom. nov. for [*Hippobosca*] *vespertilionis Fabricius*, 1805:339, suppressed by I.C.Z.N., 1936:29)

Euctenodes Waterhouse, 1879:310.—Garcia and Casal, 1965:5.

Type Species: *Euctenodes mirabilis* Waterhouse, 1879:310
Waterhouse, 1879:310

Dr. T. C. Maa called my attention to a valuable but scarce paper on the genus *Euctenodes* (= *Strebla*) by Garcia and Casal (1965). I was unaware of this when we (Wenzel et al., 1966; Wenzel, 1970) treated the species of *Strebla*. Dr. B. V. Peterson has kindly given me a Xerox copy. In this paper, Garcia and Casal described three new species and redescribed *E. tonatiae* Kessel and *E. mirabilis* Waterhouse. The specimen which they treated as *mirabilis* appears to be *S. wiedemannii* (*q.v.*). The species they described as new are, with one exception, synonyms. They are discussed below, where appropriate. These authors not only provided excellent illustrations but focused on some interesting character states not previously treated, especially the extent of longitudinal, nonsetose, areas on each side of the mesosternum.

In 1970, I inadvertently failed to list *Strebla mexicana* Rondani in the "Catalogue of the Diptera of the Americas . . ." This species is not identifiable until the type can be cleaned and studied (see Wenzel et al., op. cit., p. 610). Thirteen of the 16 previously named species are represented in the Venezuelan Survey Collections, as well as 9 new species described below. In the following key, I have included all of the known species of *Strebla* excepting *mexicana* Rondani. Following the key, the species are arranged alphabetically to facilitate referring to them.

Key to the Species of *Strebla*

1. Frontoclypeus entire [9] (Fig. 56B). The anterior (second) pigmented prescutal suture absent or indistinct 2
   Frontoclypeus with a pair of apical detached plates (Fig. 56A) or with an unsclerotized median suture. Anterior pigmented prescutal suture usually distinct (absent in *S. christinae*) 6

2. Upper edge of metatibiae with 2-3 conspicuously longer macrosetae (Fig. 59F) *hertigi* Wenzel
   Upper edge of metatibiae with 6-8 conspicuously longer macrosetae 3

3. Anterior margin of postvertex forming an obtuse angle (Fig. 58A); all festoon setae of postvertex and occiput slender. Epaulets continued across entire width of prescutum by a row of short coarser bristles behind the anterior margin .... *diaemi* Wenzel
   Anterior margin of postvertex forming an angle less than or only slightly greater than 45°. Setae of postvertex and at least one of inner occipital setae (on each side) distinctly heavier than the others, often spinelike. Prescutal epaulets isolated on each side, not joined by a row of setae behind anterior margin 4

4. Apex of third longitudinal vein with a conspicuous macroseta. Eyes consisting of a single elongate hyaline lens, facets indistinguishable 5
   Bristle at apex of third longitudinal area only slightly longer and stronger than preceding setae. Eyes distinctly faceted .... *consocia* Wenzel

5. Mesonotum (Fig. 64A) more sparsely setose, the prescutum with only 25-28 setae on each side behind the epaulets, not counting setae along lateral margins; scutum laterally with 2 irregular rows of setae between antescutellar row and transverse suture; setae of antescutellar row subequal .... *hoogstraali* Wenzel
   Mesonotum (Fig. 64C) more densely setose, the prescutum with 42-46 setae on each side behind epaulets; scutum toward sides with 3 irregular rows of setae between antescutellar row and transverse suture; some lateral setae of antescutellar row distinctly longer than the median ones .... *tonatiae* Kessel

6. Frontoclypeus with a median unsclerotized suture (Fig. 58F); postvertex and occipital lobes as in Fig. 57D .... *galindoi* Wenzel

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[9] The detached frontoclypeal plates in *matsoni* are relatively large but feebly pigmented and difficult to distinguish, but this species has an anterior pigmented prescutal suture, unlike the species of this alternative.

Frontoclypeus with a pair of apical detached plates, these sometimes feebly sclerotized (*matsoni*) or very small and difficult to detect 7

7. Eyes a single elongate, hyaline lens 8
Eyes multifaceted 9

8. Shape of postvertex similar to that of *hertigi* (q.v.), but with anterior margin more distinctly projecting in a point at middle; setae very short, only about half as long as postvertex. MALE. Apices of postgonites distinctly downwardly curved .... ***obtusa*** n. sp.
Shape of postvertex as in Fig. 58D; setae as long as or longer than postvertex. MALE. Ventral margins of postgonites straight .... ***machadoi*** Wenzel

9. Metatibiae with 2 dorsal rows of setae that are distinctly longer than the others, those of at least one row as long as or longer than greatest width of tibiae 10
Metatibiae with a single row of distinctly longer setae, some of which may be nearly as long as longest width of tibiae, or with dorsal setae not conspicuously longer than lateral setae; with 2 or 3 subapical macrosetae 11

10. Postvertex as in Fig. 58E. Abdominal connexival setae mostly short; the medioventral setae, with the exception of the pairs of longer segmentally arranged setae, no longer than discal setae of sternum 2. Metatibiae with 9-12 conspicuous macrosetae, most of them distinctly longer than greatest width of tibiae, much as in *consocia* (Fig. 59A). Male postgonites very strongly curved .... ***christinae*** Wenzel
Postvertex as in Fig. 57B. Abdominal connexival setae longer, the ventromedial ones distinctly longer than discal setae of sternum 2. Metatibiae with two rows of dorsal setae that are longer than the others, many of them no longer than width of tibia, but which become gradually longer apically, the last seta of each row a distinctly longer and stronger macroseta (Fig. 59B). Male postgonites rather evenly and feebly curved .... ***wiedemanni*** Kolenati

11. Anterior projection of postvertex very blunt (Fig. 56A) 12
Anterior margin of postvertex obtusely angulate, or with a median projection which may either be somewhat pointed or rounded but not broad and blunt 14

12. MALE. Postgonites very long and slender (Fig. 60E). FEMALE. Seventh sternites very large with 17-18 setae .... ***harderi*** n. sp.
MALE. Postgonites not as long and slender (Fig. 60D). FEMALE. Seventh sternites with 15 or fewer setae 13

13. Anterior division of each laterovertex with 7 setae (not including seta inserted above eye). MALE. Each side of tergum 9 with 9-11 setae including 3-4 macrosetae along distal side margins, and 5-8 short setae behind them. FEMALE. Dorsolateral connexival setae shorter, subequal in length to those along middle of underside, none of them nearly as long as anterodorsal setae of lateral lobes of tergum 1 + 2. Seventh sternites with only 7-10 setae, including 4 macrosetae .... ***curvata*** n. sp.
Anterior division of each laterovertex with 6 setae. MALE. Each side of tergum 9 usually with 4 macrosetae and 4 shorter setae. FEMALE. Dorsolateral connexival setae very long, nearly as long but not as coarse as anterior setae of lateral lobes of tergum 1 + 2. Seventh sternites each with 11-13 setae, including 2 very long macrosetae, the others fairly long, subequal .... ***guajiro*** Garcia and Casal

14. Innermost 3-4 festoon setae of occipital plates very short and fine (Fig. 57G), though the first 1-2 may be very weak spinelets, none more than one-third as long as setae of postvertex .... ***altmani*** Wenzel
1-2 or more inner festoon setae are strong spinelets or are longer and slender with the innermost setae more than half as long as setae of postvertex 15

15. All occipital setae of head fine, bristlelike, none of them spinelets (setae of postvertex may be coarser) 16
At least 1-2, usually 3-4, inner occipital setae on each side are spinelets 17

16. Head broader, ante-ctenidial area distinctly broader than long; anterior margin of postvertex broadly obtusely angulate; festoon setae of occipital lobes longer, the innermost setae of each occipital lobe usually about ⅔ as long as or subequal in length to setae of postvertex. Anterolateral longitudinal bare area on each side of mesosternum not extending posteriorly beyond procoxal cavity .... *matsoni* n. sp.
Head long, length and width of ante-ctenidial area subequal. Anterior margin of postvertex forming an angle of 45° or less; festoon setae very short, the innermost seta of each lobe no more than ⅓ as long as setae of postvertex. Longitudinal bare areas of mesosternum extending distinctly beyond procoxal cavities 17

17. Four transverse rows of setae present laterally in the intervals between the transverse prescutal sutures. Female. Supra-anal plate with 2 pairs of discal setae in addition to the distal macrosetae. Male. Sternum 5 distinctly emarginate at middle, sometimes so deeply as to nearly divide it .... *chrotopteri* n. sp.
No more than 2 or 3 transverse rows of setae laterally between the transverse prescutal sutures (sometimes 4 irregular rows in *diphyllae*) 18

18. Detached frontoclypeal plates comma shaped .... *proxima* n. sp.
Detached frontoclypeal plates rectangular 19

19. Longitudinal bare area on each side extending almost the entire length of the mesosternum. Female. Seventh sternites very small, with only 4-6 setae. Male. Sternum 5 absent or indistinct; if recognizable then partially fused with sternum 6 and ventral arms of sternum 7+8, and sometimes with a single seta on apical margin near sides .... *asternalis* n. sp.
Longitudinal bare area on each side of mesosternum extending midway between pro- and mesocoxal cavities or slightly beyond 20

20. Discal setae on each side, not including marginals, between transverse prescutal sutures arranged in 2 transverse rows (an extra seta inserted near outer edge of setose area sometimes gives the appearance of 3 rows) 21
Setae on each side between prescutal sutures arranged in 3 transverse rows 22

21. Measurements: TL, males, 0.58-0.59; females, 0.63-0.67. WL, males, 1.10-1.21, females, 1.35-1.37. Males. Apical portion of postgonites bent at about 45° from the long axis .... *alvarezi* Wenzel
Measurements: TL, males, 0.65-0.71; females, 0.70-0.73. WL, males, 1.36-1.43; females, 1.50-1.59. Male. Postgonites strongly curved, the apical portion at right angles to the long axis .... *cormurae* n. sp.

22. Festoon setae of postvertex and occipital lobes slender and strong but not spinelike (Fig. 58C). Mesonotum with dense setae (Fig. 61A). Female. Dorsolateral abdominal connexival setae as long as or subequal to anterodorsal setae of lateral lobes of tergum 1+2, but more slender .... *diphyllae* Wenzel
Festoon setae of head stronger, spinelike (Fig 57A). Mesonotal setae sparser (Fig. 62A, 64F). Female. Dorsolateral connexival setae much shorter than anterodorsal setae of lateral lobes 23

23. Males 26
Females 24

24. Supra-anal plate with 4 macrosetae, lacking a pair of shorter discal setae .... *paramarabilis* n. sp.
Supra-anal plate with 4 macrosetae and a pair of shorter discal setae, these situated between the macrosetae and the sutural groove separating the plate from tergum 7, the latter with the usual pair of very long macrosetae and a pair of shorter setae 25

25. Seventh sternites with 11-12 setae .... *kohlsi* Wenzel
Seventh sternites with ± 15 setae .... *mirabilis* Waterhouse

26. Tergum 9 with ± 11 setae (6 of them short). Postgonites rather evenly curved (Fig. 60C) .... *paramirabilis* n. sp.
Tergum 9 with 16-17 setae (7-9 of them short). Postgonites usually angulately bent .... *mirabilis* Waterhouse
kohlsi Wenzel

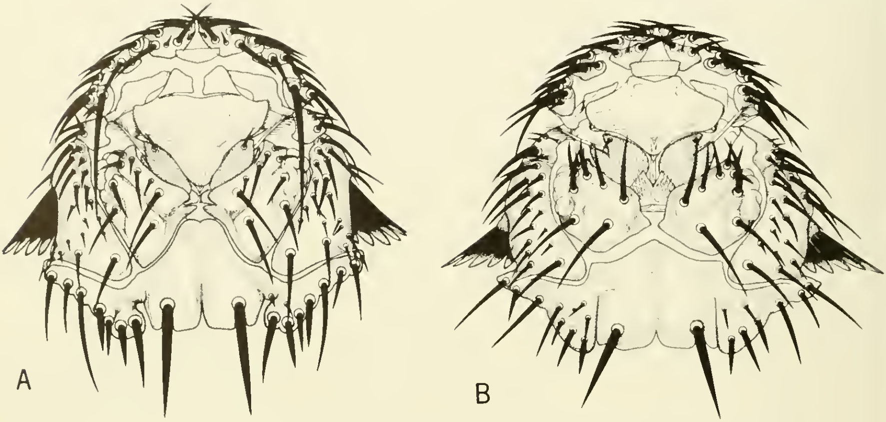

Fig. 56. Dorsum of head: A, *Strebla guajiro* (Garcia and Casal); B, *Strebla hertigi* Wenzel. From Wenzel et al. (1966; A as *Strebla carolliae*).

Strebla altmani Wenzel

(Fig. 57G, 63E)

Strebla altmani Wenzel, 1966:623, Fig. 123G, 137A.

VENEZUELAN SURVEY RECORDS (135 males, 98 females)

APURE: 40 males and 31 females ex *Lonchorhina orinocensis*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 6-28-XII-65; 3 males, same host, 1 km W Pto. Páez, Cerro de Murcielagos, Pto. Páez, 76 m, 19-24-I-66.

BARINAS: 2 males and 1 female ex *Lonchorhina aurita*, 7 km NNE Altamira, Altamira, 1,070 m, 25-XII-67.

BOLÍVAR: 2 males ex *Lonchorhina aurita*, 20 km W La Paragua, Hato San José, 300 m, 8-IV-67.

CARABOBO: 1 male and 1 female ex *Lonchorhina aurita*, 10 km NW Urama, El Central, Urama, 25 m, 23-III-66.

DTO. FEDERAL: 2 males and 1 female ex *Lonchorhina aurita*, nr. El Limón, 48 km W Caracas, Hda. Carapiche, 380-398 m, 21-VIII-66.

MIRANDA: 2 males ex *Lonchorhina aurita*, 4 km SW Birongo, Cueva Walter Dupouy, Birongo, 195 m, 28-I-68; 4 males and 4 females, same host, Birongo, 60 m, 22-23-I-68.

T. F. AMAZONAS: 2 males and 1 female ex *Lonchorhina orinocensis*, 14 km SSE Pto. Ayacucho, El Gavilan, Pto. Ayacucho, 135 m, 11-X-67; 1 male and 1 female, same host, 25 km S Pto. Ayacucho, Paria, Pto. Ayacucho, 114 m, 13-20-IX-67; 1 female, same host, 30 km S Pto. Ayacucho, Coromoto, Pto. Ayacucho, 126 m, 8-X-67; 1 male and 2 females ex 1 *Lonchorhina aurita*, 84 km SSE Esmeralda, 7 km up Río Mavaca, Boca Mavaca, 138 m, 2-III-67; 1 male ex 1 *Macrophyllum macrophyllum*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 25-VII-67.

TRUJILLO: 29 males and 18 females ex *Lonchorhina aurita*, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 3-IX–6-X-65; 3 males and 4 females, same host, 23 km N Valera, nr. Agua Viva, Valera, 164 m, 30-VIII-65; 1 male, same host, 23 km NNW Valera, Río Motatan, Valera, 90 m, 8-X-65; 1 male and 2 females, same host, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 18-IX-65; 9 males and 12 females, same host, 26 km N Valera, Quebrada Seca, Valera, 131 m, 21-X-65.

YARACUY: 2 males and 1 female ex *Lonchorhina aurita*, 20 km NW San Felipe, Minas de Aroa, 395-400 m, 6-23-XII-67.

ZULIA: 1 male ex *Lonchorhina aurita*, 65

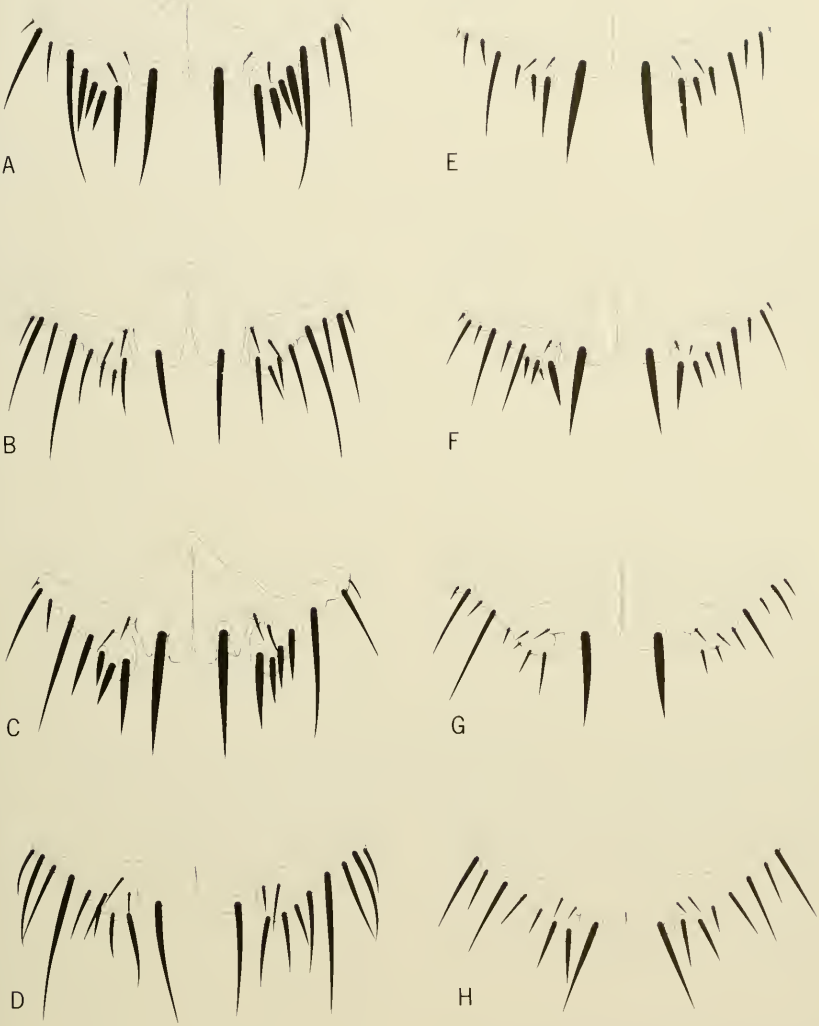

Fig. 57. Postvertex and occipital plates of species of *Strebla*: A. *Strebla mirabilis* (Waterhouse); B, *Strebla wiedemanni* Kolenati; C, *Strebla kohlsi* Wenzel; D, *Strebla galindoi* Wenzel; E-F, *Strebla alvarezi* Wenzel (E, Panama; F. Guatemala); G, *Strebla altmani* Wenzel; H, *Strebla hoogstraali* Wenzel. From Wenzel et al. (1966).

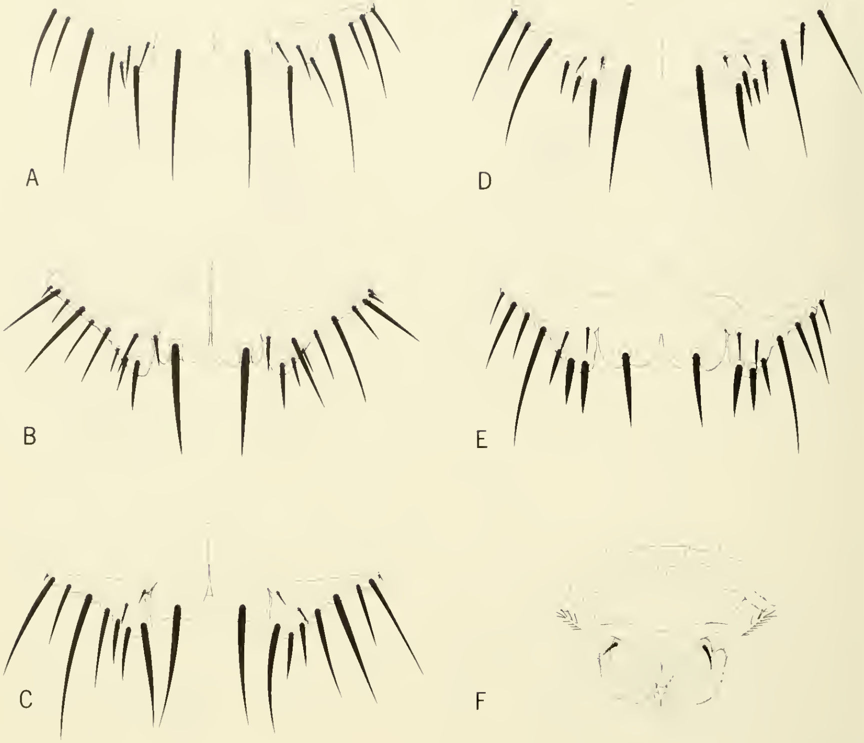

Fig. 58. A-E, postvertex and occipital plates (of head) of species of *Strebla*: A, *Strebla diaemi* Wenzel; B, *Strebla consocia* Wenzel; C, *Strebla diphyllae* Wenzel; D, *Strebla machadoi* Wenzel; E, *Strebla christinae* Wenzel. F, *Strebla galindoi* Wenzel: antennae and frontoclypeus. From Wenzel et al. (1966).

km WNW Encontrados, Caño Azul, El Rosario, 95 m, 25-III-68; 28 males and 18 females, same host, 21 km SW Machiques, Kasmera, 270 m, 15-20-IV-68.

OTHER VENEZUELAN MATERIAL EXAMINED

ARAGUA: 12 paratypes ex *Lonchorhina aurita*, Rancho Grande, 18-VII–12-VIII-49, J. Racenis.

REMARKS

In Panamanian specimens of *Strebla altmani*, the inner setae of the posterior margin of the occipital lobes are very short, fine, and evenly tapered. The prescutal setae are rather sparsely distributed and arranged in three irregular transverse rows. In Venezuelan specimens from both *Lonchorhina aurita* and *L. orinocensis*, at least the innermost seta of the occipital lobes and sometimes the next one are less evenly tapered and appear more like spinelets, and the detached frontoclypeal plates are a little longer. The chaetotaxy of the mesonotum varies. In some areas, the specimens from L. orinocensis are very similar to those from Panama, but the discal prescutal setae between the transverse sutures are arranged in two transverse rows, and toward each side another seta or two may be inserted between these to give the appearance of a third row. Many specimens from *L. aurita* have more numerous setae on both prescutum and scutum, those between the transverse prescutal sutures clearly arranged in three rows. However, host associations of these forms are not consistent. Unfortunately, the number of specimens that have been prepared on slides is not sufficient to further analyze the material statistically or in relation to host and geographic distribution.

The Venezuelan specimens could prove to represent two cryptic species, distinct from *altmani*, whose host relations shift geographically. The existence of two very similar species of *Trichobius* on the species of *Lonchorhina* in Venezuela, neither of them known from Panama, suggests such a possibility. One of these (*T. flagellatus*) was taken from both species of *Lonchorhina*.

Strebla alvarezi Wenzel

(Fig. 57E, F; 63G)

Strebla alvarezi Wenzel, 1966:625, Fig. 123E-F, 137B

Venezuelan Survey Records (6 males, 3 females)

BOLÍVAR: 3 males and 1 female ex *Micronycteris microtis*, 21 km NE Icabarú, El Pauji, Icabarú, 851 m, 3-V-68; 1 male ex 1 *Carollia brevicauda*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 9-VI-66.

FALCÓN. 1 female ex 1 *Glossophaga soricina*, 19 km NW Urama, Km 40, Urama, 25 m, 26-X-66.

T. F. AMAZONAS: 1 female ex 1 *Lonchophylla thomasi*, 25 km S Pto. Ayacucho, Paria, Pto. Ayacucho, 114 m, 17-IX-67; 1 male ex *Micronycteris microtis*, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 21-II-66.

YARACUY: 1 male ex 1 *Micronycteris megalotis*, 10 km NW Urama, El Central, Urama, 25 m, 8-III-66.

Host Associations

Of nine specimens of this scarce species that were collected in Venezuela by the survey teams, six (66 percent) were from three specimens of *Micronycteris microtis* and *M. megalotis*. The collection data suggest that the other host records are valid and may represent temporary transfers to other hosts which roost in some of the same situations as do species of *Micronycteris*. In Panama (Wenzel et al., 1966:626-627, 647-648), S. *alvarezi* was taken chiefly on various species of *Micronycteris* and *Saccopteryx bilineata*.

Strebla asternalis, new species

(Fig. 60F, 63I)

Strebla asternalis superficially resembles S. *machadoi* in the shape and chaetotaxy of the postvertex and occipital lobes, in the length of the longitudinal bare areas of mesosternum which extend nearly to apex in both species, and in the shape of the male postgonites, which are nearly straight, not curved. It is easily separated from *machadoi* by the multifaceted eyes, the even smaller female seventh sternites, the very sparsely setose sternum 2, and the absence of male sternum 5—or its presence as a vaguely sclerotized band which is irregularly fused to the lower arms of sterna 7+8 and sternum 6.

Description

Head. Elongate; chaetotaxy and postvertex as in *Strebla machadoi*, but eyes multifaceted and festoon setae of postvertex and occipital lobes generally a little more slender. Antectenidial area of underside distinctly longer than broad. *Thorax.* Chaetotaxy as in Fig. 63I. Prescutum with at least 5 strong epaulet setae and sometimes a short discal setae in the same row; setae of prescutal arcs quite long, some of them longer than innermost festoon setae of occipital lobes; 4-5 discal setae present anterior to each arc; setae in lateral intervals between prescutal sutures arranged in 3 rows, some of them quite long; central setae in front of the transverse suture markedly smaller. Scutum with ± 35 short setae and an antescutellar row of about 12 setae, some of them slightly longer than the discals, most of them at least twice as long. Longitudinal bare areas on each side of mesosternum extending nearly to mesocoxae. *Legs.* Mostly without distinctive characters. Metatibiae with outer dorsal row of setae longer than the others and becoming longer distally, 1 or 2 of them quite long and slender; 2 widely spaced macrosetae on about apical fourth. *Abdomen.* Sternum 2 very sparsely setose, with 16-24 discal setae, the posterior ones about twice as long; distal margin with 8-9 discal setae, 3 or 4 slightly longer than the longer discal setae, others twice as long, and 3 or 4 are much longer macrosetae which may be more than half as long as sternum. Dorsolateral, lateral, and ventral abdominal connexival setae subequal, a few of the medial setae on venter near apex a little longer; with the usual long, paired, segmentally arranged, ventral setae. Female. Tergum 7 lanceolate, narrower anteriorly, with a pair of subapical macrosetae and distal to these a pair of more closely placed short setae. Supra-anal plate with 4 very slender, long setae, sometimes with a pair of very short discal setae anterior to these. Seventh sternites very small, transversely oval, each with 4-6 setae, 3 or 4 of them usually slender macrosetae which may be nearly twice as long as a sternite is wide. Male. Sternum 5 absent or represented by a vague sclerotized area which may bear a seta in each lateral cor-

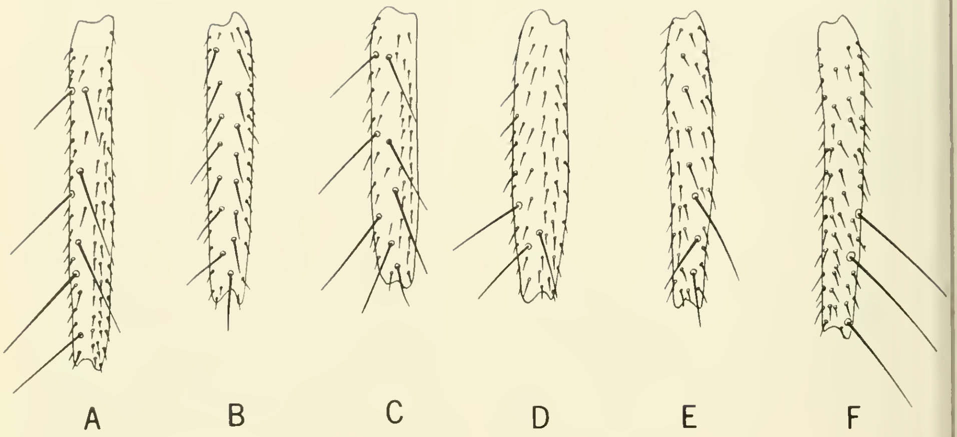

Fig. 59. Metatibiae, dorsal view, of species of *Strebla*: A, *Strebla consocia* Wenzel; B, *Strebla wiedemanni* Kolenati; C, *Strebla diaemi* Wenzel; D, *Strebla galindoi* Wenzel; E, *Strebla mirabilis* (Waterhouse); F, *Strebla hertigi* Wenzel. From Wenzel et al. (1966).

ner, is more narrow at middle and unevenly united with ventral arms of sternum 7+8 and Sternum 6. Sternum 7+8 on each side with 3 long dorsolateral setae, the middle one about twice as long as the others. Tergum 9 on each side usually with 2 laterodistal macrosetae, 2 shorter macrosetae below these and 2 short setae anterior to this row. Postgonites strongly narrowed from base to apex, slender distally, ventral margin nearly straight, curved only near base (Fig. 60F).

Measurements

	Males	Females
BL	2.36-2.68	2.81-2.96
TL	0.90-1.48	0.94-0.96
WL	1.84-1.95	2.00-2.01
WW	0.80-0.91	0.88-0.92

Type Data: Male holotype and female allotype ex *Saccopteryx bilineata* (SVP 17842), Venezuela, T. F. Amazonas, 108 km SSE Esmeralda, Río Mavaca, 140 m, 5-11-IV-67. Paratypes—VENEZUELA. T. F. Amazonas: 8 males and 2 females, same data as the holotype; 5 males and 2 females ex 1 *Saccopteryx* sp., 84 km SSE Esmeralda, 9 km up Río Mavaca, Boca Mavaca, 138 m, 10-III-67; 3 males and 1 female ex *Saccopteryx bilineata*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 3-I-67.

Strebla christinae Wenzel

(Fig. 7A, 58E, 62C)

Strebla christinae Wenzel, 1966:606, Fig. 44A, 124E, 131A

Venezuelan Survey Records (114 males, 95 females)

APURE: 12 males and 4 females ex *Phylloderma stenops*, 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 16-XII-65.

BOLÍVAR: 7 males and 5 females ex *Phylloderma stenops*, 20 km W La Paragua, Hato San José, 300 m, 6-IV-67.

FALCÓN: 1 male ex 1 *Carollia perspicillata*, 3 males and 1 female ex *Phylloderma stenops*, 19 km NW Urama, Km 40, Urama, 25 m, 25-X-65; 2 females, same host, 28 km WNW Pto. Cabello, Boca de Yaracuy, 2 m, 3-X-65; 4 males and 5 females, same host, 16 km ENE Mirimire, nr. La Pastora, 70 m, 30-XI-67.

SUCRE: 7 males and 11 females ex *Phylloderma stenops*, 21 km E Cumaná, 1 m, 13-XII-66.

T. F. AMAZONAS: 1 female ex 1 *Eumops glaucinus*, 28 males and 11 females ex *Phylloderma stenops*, 163 km ESE Pto. Ayacucho,

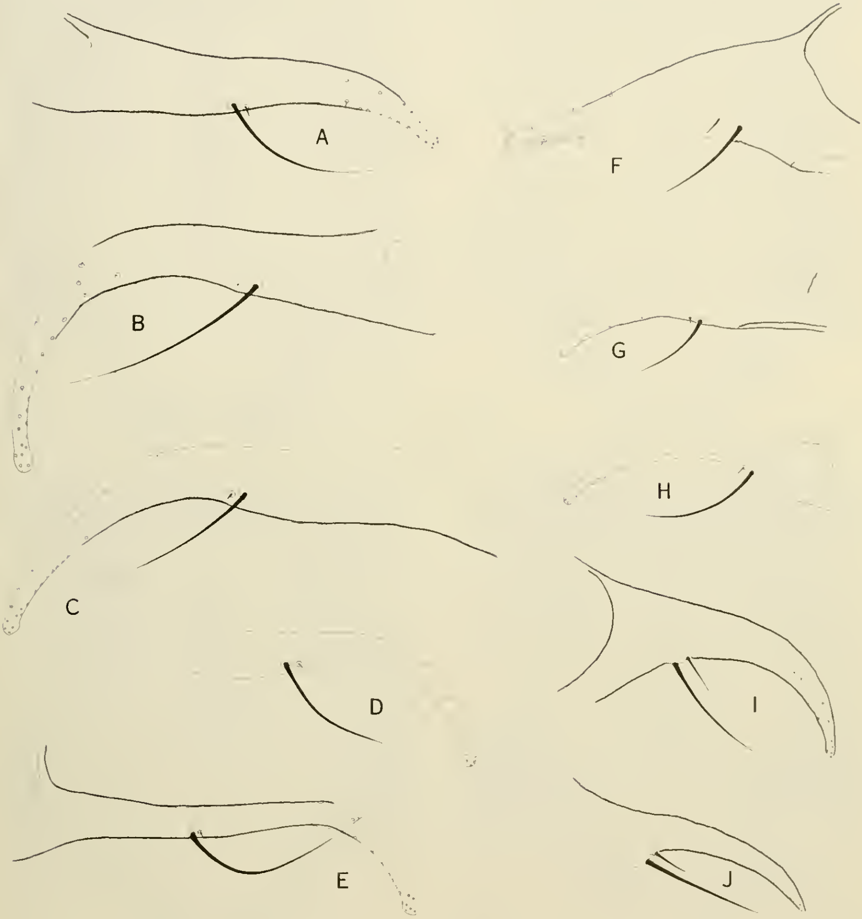

Fig. 60. Male postgonites: A, *Strebla obtusa*, new species (SVP 7743); B, *Strebla proxima*, new species (SVP 14931); C, *Strebla paramirabilis*, new species (holotype); D, *Strebla curvata*, new species (SVP 5552); E, *Strebla harderi*, new species (SVP 29349); F, *Strebla asternalis*, new species (SVP 16779); G, *Strebla matsoni*, new species (SVP 17737); H, *Strebla chrotopteri*, new species (SVP 14880); I, *Anastrebla spurrelli*, new species (SVP 8358); J, *Anastrebla caudiferae*, new species (SVP 10508).

Río Manapiare, San Juan, 155 m, 13-28-VII-67; 1 female ex 1 *Uroderma magnirostrum*, 3 males and 6 females ex *Phylloderma stenops*, Río Orinoco, 135 m, 20-IV–15-V-67; 25 males and 26 females, same host, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 2-4-I-67; 7 males and 10 females, same host, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 6-VI-67; 9 males and 1 female, same host, 33 km S Pto. Ayacucho, El Raudal, Pto. Ayacucho, 195 m, 20-IX-67; 16 males and 20 females, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-14-IV-67.

HOST ASSOCIATIONS

Of 195 specimens of *Strebla christinae* collected by the survey teams, 192 (98.5 percent) were from *Phylloderma stenops*. The remaining 3 specimens were from 3 bats of 3 other species and probably are contaminants or represent temporary associations. The type series from Panama were also from *P. stenops*.

Strebla chrotopteri, new species

(Fig. 60H. 64E)

Strebla chrotopteri is easily distinguished from *S. mirabilis*, which it resembles, as well as from other species by the following combination of characters: the 4 transverse rows of setae between the prescutal sutures; the 2 pairs of discal setae on the female supra-anal plate; the strong emargination of male sternum 5 which sometimes is nearly divided into 2 sternites and which accommodates the angulately, anteriorly projecting fused ventral arms of sternum 7+8 and sternum 6; and the rather feebly curved male postgonites.

DESCRIPTION

Head. Virtually identical to that of *Strebla mirabilis* in general structure, shape of the postvertex and chaetotaxy; ante-ctenidial area about as long as wide; anterior division of each laterovertex usually with 9 setae. Eyes with about 8 facets. *Thorax*. Chaetotaxy as in Fig. 64E. Each epaulet usually with 4 (sometimes 3) setae, the inner seta generally weaker; prescutal arcs well defined, each with 5 long setae and, medially, continued to near apex of prescutum by shorter setae; intervals on each side between transverse sutures with setae in 4 irregular transverse rows. *Legs*. Very similar to those of S. *mirabilis*; metatibiae with outer row of dorsal edge slightly longer than the others and with 2 subapical macrosetae. *Abdomen*. Dorsolateral connexival setae long and slender in both sexes, but a little longer and much more extensive in the female, many of them as long as the longer setae of the antescutellar row; lateral and ventral setae subequal, the medioventrals a little longer and generally slightly longer than discal setae of sternum 2. Sternum 2 with 25-34 discal setae (average slightly smaller in males); posterior margin with 11-16 setae, 8-10 of them strong, mostly macrosetae, separated by several shorter setae which are often no longer than the discals, but which, like the other shorter marginals, may be twice as long as the discals; the innermost macroseta on each side may be more than half the length of the sternum. FEMALE. Tergum 7 elongate-oval, narrowed anteriorly, somewhat lanceolate; distally with a pair of macrosetae, and, posterior to these, a pair of more closely placed, shorter setae, these about half as long. Supra-anal plate with the usual 4 distal macrosetae and 2 pairs of short discal setae, the posterior pair a little longer and more widely separated. Seventh sternites fairly large, transverse, subreniform, anterior margin rather deeply emarginate; with 12-15 setae of varying lengths, a couple of them conspicuously longer and as long as sternites are wide; the shorter setae subequal to length (morphological) of sternites. MALE. Sternum 5 angulate, with posterior edge rather strongly, angulately emarginate at middle, sometimes nearly divided into 2 sternites; discal setae a little shorter than ventral connexivals, usually arranged in two (sometimes one) irregular rows laterally and in one row, or absent, at middle; distal margin with 11-16 longer setae, 8-10 of them macrosetae of varying lengths, the inner pair longest, at least twice as long as greatest length of sternum, the others becoming shorter laterad. Sternum 6 and 7+8 strongly bent anteriorly, corresponding to the emargination of sternum 5; each side of sternum 7+8 with a very long dorsolateral macroseta on each side and sometimes a shorter seta medial to it. Tergum 9 on each side with 3 (sometimes 2) thin dorsolateral macrosetae, and 3 long laterodistal macrosetae, 2 of them as long as the macrosetae of sternum 7+8; 7-9 short setae anterior to these. Postgonites rather long, feebly curved, macrosetae inserted near midlength (Fig. 60H).

MEASUREMENTS

	Males	Females
BL	2.72-3.39	2.86-3.20
TL	0.99-1.05	1.00-1.08
WL	1.87-2.04	1.97-2.13
WW	1.01-1.06	1.04-1.09

TYPE DATA: Male holotype ex *Chrotopterus auritus* (SVP 14882), Venezuela, Falcón, 11 km ENE Mirimire, nr. La Pastora, 220 m,

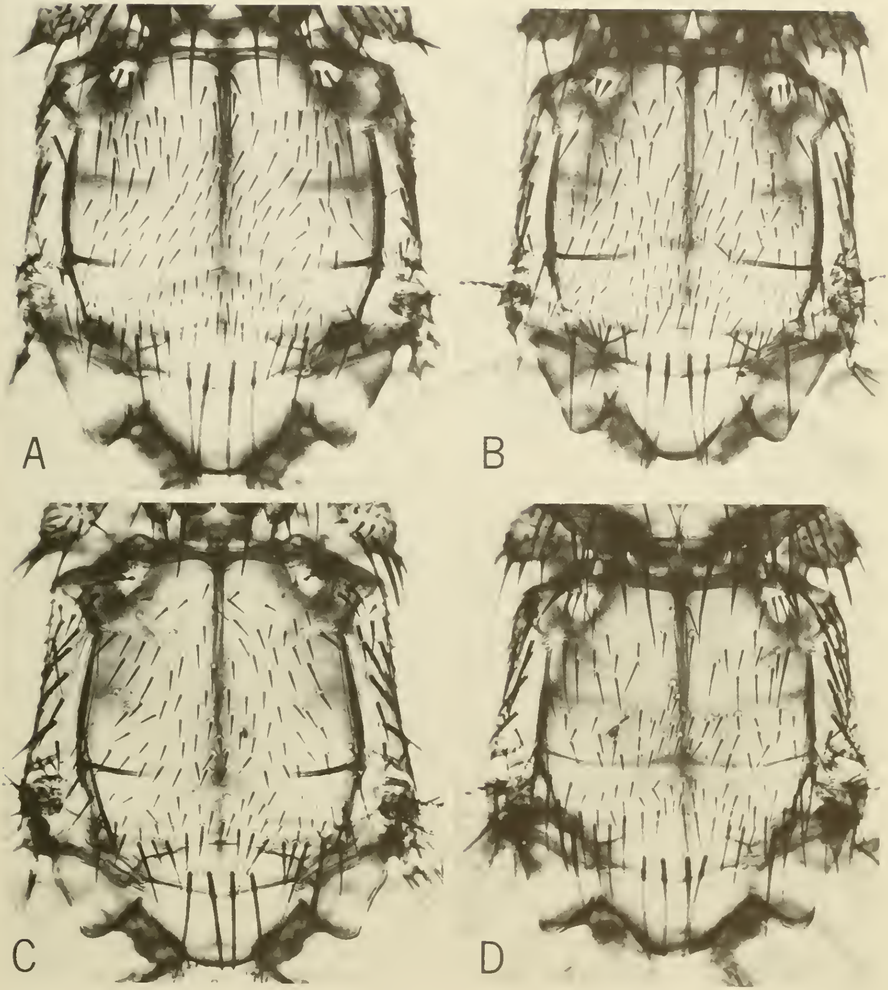

Fig. 61. Thorax, dorsal view: A, *Strebla diphyllae* Wenzel; B, *Strebla wiedemanni* Kolenati; C, *Strebla consocia* Wenzel; D, *Strebla galindoi* Wenzel. From Wenzel et al. (1966).

14-XI-67 and female allotype, same host (SVP 14880), 12 km ENE Mirimire, nr. La Pastora, 220 m, 14-XI-67. Paratypes—VENEZUELA. Bolívar: 3 males and 2 females ex *Chrotopterus auritus*, 45 km NE Icabarú, Santa Lucia de Surukun, Icabarú, 851 m, 1-V-68. Falcón: 6 males and 4 females, same host and locality data as the holotype; 12 males and 6 females, same host and locality data as the allotype; 14 males and 9 females, same host, 1 male ex 1 *Chiroderma villosum*, 19 km NW Urama, Km 40, Urama, 25 m, 28-X—3-XI-65. T. F. Amazonas: 2 males and 3 females ex *Chrotopterus auritus*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 9-II-67; 10 males and 8 females, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-14-IV-67; 6 males and 7 females, same host, 163 km ESE Pto. Ayacucho, Río Manapaire, San Juan, 155 m, 26-VII-67. Yaracuy/Carabobo: 2 males and 3 females ex *Chrotopterus auritus*, 10 km NW Urama, Urama, 25 m, 17-X-65. Zulia: 4 males and 2 females ex *Chrotopterus auritus*, 1 male ex 1 *Phyllostomus discolor*, 21 km SW Machiques, Kasmera, 270 m, 17-IV- 68.

Host Associations

Of 97 specimens of *Strebla chrotopteri* that were collected by the survey teams, 95 (98 percent) were from *Chrotopterus auritus*. The records from *Chiroderma villosum* and *Phyllostomus discolor* may represent contaminants, since specimens of *C. auritus* were collected at the same locality and on the same dates.

Strebla consocia Wenzel (emendation)

(Fig. 58B, 59A, 61C)

Strebla consocius Wenzel, 1966:600, Fig. 124B, 125A, 128

Euctenodes mirabilis, authors (part), not Waterhouse

Venezuelan Survey Records (201 males, 175 females, 3 sex undet.)

APURE: 2 males and 4 females ex *Phyllostomus hastatus*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 30-31-I-68; 1 male ex *Phyllostomus elongatus*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 24-XII-65.

BARINAS: 1 male and 2 females ex *Phyllostomus hastatus*, 2 km SW Altamira, Altamira, 620 m, 26-XII-67; 4 males and 4 females, same host, 1 female ex 1 *Vampyrops helleri*, Altamira, 794 m, 21-XII-67.

BOLÍVAR: 1 female ex *Phyllostomus elongatus*, 25 km SE El Manteco, Los Patos, 150 m, 5-IV-66; 4 males and 4 females, same host, 50 km SE El Manteco, Río Supamo, 150 m, 11-IV-66; 1 female ex *Phyllostomus hastatus*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 17-VI-66; 1 male and 1 female, same host, 28 km SE El Manteco, Los Patos, 150 m, 11-IV-66.

CARABOBO: 1 male ex *Phyllostomus hastatus*, 2 km SE Montalbán, Potrerito, Montalbán, 598 m, 1-XI-67; 1 male, same host, 6 km N Urama, Urama, 60 m, 17-III-66.

FALCÓN: 1 male ex *Phyllostomus hastatus*, 80 km NW Carora, Río Socopito, 480 m, 20-V-68.

MIRANDA: 2 males and 5 females ex *Phyllostomus hastatus*, Birongo, 60 m, 22-23-I-68; 18 males and 20 females, same host, Cueva Alfredo Jahn, Birongo, 60-160 m, 20-I-68; 1 male, same host, 21 km NW Altagracia, Parque Nac. Guatopo, 630 m, 2-X-66.

MONAGAS: 1 male ex *Phyllostomus elongatus*, 4 males, 1 female, and 1 sex undet. ex *Phyllostomus hastatus*, 55 km SSE Maturin, Hato Mata de Bejuco, 18 m, 3-4-VI-68; 3 males and 5 females, same host, 3 km NW Caripe, nr. San Agustín, 1,175 m, 11-VII-67; 7 males and 3 females, same host, 5 km NW Caripe, San Agustín, 1,165 m, 26-VI-67.

SUCRE: 23 males and 23 females ex *Phyllostomus hastatus*, 26 km ESE Carúpano, Manacal, 175-370 m, 20-28-VII-67.

T. F. AMAZONAS: 2 males and 1 female ex *Phyllostomus elongatus*, 3 males and 2 females ex *Phyllostomus hastatus*, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 20-II—24-III-67; 13 males and 16 females, same host, 2 males ex *Phyllostomus elongatus*, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 30-V—7-VI-67; 3 males, same host, 2 males and 5 females ex *Phyllostomus hastatus*, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 6-IX—10-X-67; 30 males, 28 females, and 1 sex undet. ex *Phyllostomus elongatus*, 1 male and 2 females ex 1 *Trachops cirrhosus*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-14-IV-67; 28 males, 15 females, and 1 sex undet. ex *Phyllostomus hastatus*, 19 males and 10 females ex *Phyllostomus elongatus*, 1 male and 1 female ex 1 *Desmodus rotundus*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 5-27-VII-67; 7 males and 8 females ex *Phyllostomus elongatus*, 3 males ex *Phyllostomus hastatus*, Río Orinoco, Tamatama, 135 m, 28-IV—8-V-67; 1 male and 2 females ex *Phyllostomus elongatus*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 16-II-67; 2 males ex *Phyllostomus hastatus*, 33 km S Pto. Ayacucho, El Raudal, Pto. Ayacucho, 195 m, 20-IX-67.

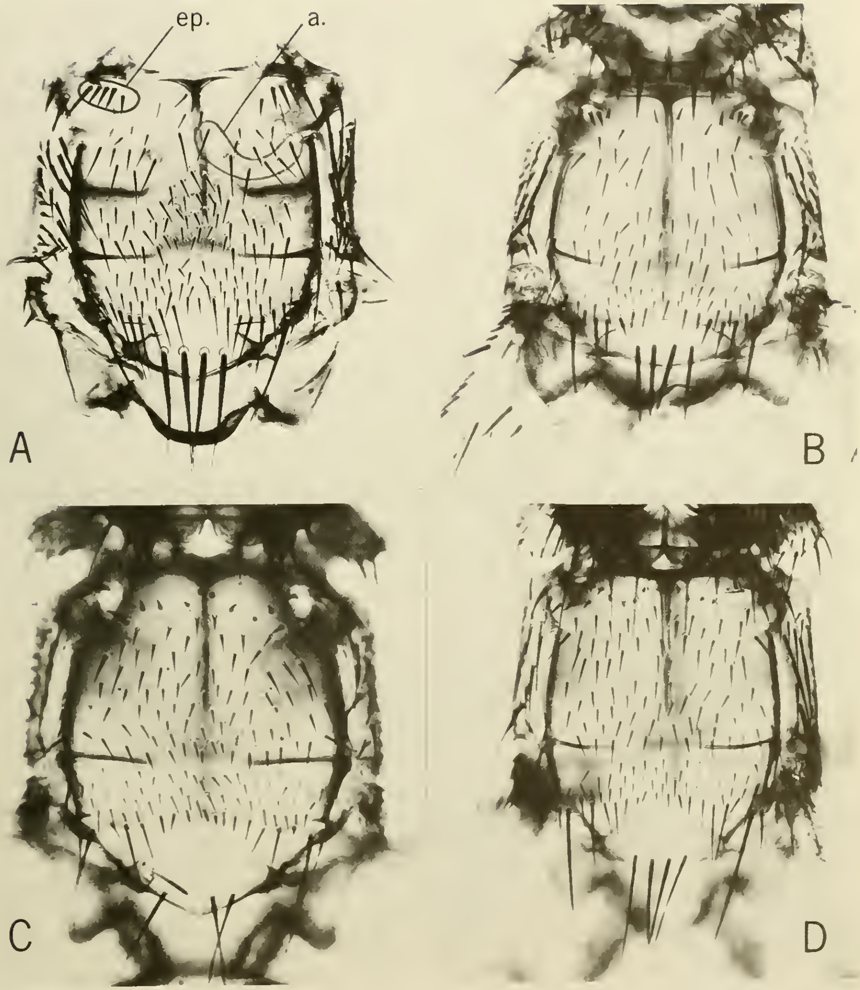

Fig. 62. Thorax, dorsal view: A, *Strebla mirabilis* (Waterhouse); B, *Strebla hertigi* Wenzel; C, *Strebla christinae* Wenzel; D, *Strebla diaemi* Wenzel. *ep.* = epaulet seta; *a.* = prescutal arc of setae. From Wenzel et al. (1966).

TRUJILLO: 6 males and 5 females ex *Phyllostomus hastatus*, 23 km NNW Valera, Río Motatan, Valera, 90 m, 2-IX-65.

YARACUY: 2 males and 1 female ex *Phyllostomus hastatus*, 11 km NW Urama, El Central, Urama, 25 m, 14-22-III-66.

ZULIA: 4 females ex *Phyllostomus hastatus*, 39 km WNW Encontrados, El Rosario, 37 m, 31-III–1-IX-68.

OTHER VENEZUELAN MATERIAL EXAMINED

MIRANDA: 1 male ex *Carollia* sp., Alfredo Jahn Cave, 7-V-61, J. Racenis, J. Ojasti, and C. Bordón.

HOST ASSOCIATIONS

Of 379 specimens of *Strebla consocia* that were collected by the survey teams, 247 (65 percent) were from 83 *Phyllostomus hastatus*, 125 (33 percent) ex *P. elongatus*, and 7 (2 percent) were from 4 bats of 4 other species. Some of the specimens from the miscellaneous hosts are probably contaminants, and I suspect that this is true of the specimens from *Trachops cirrhosus*, too, since all other specimens of that host that were collected at the same locality and on the same date as those from which *S. consocia* are reported were parasitized as usual by *S. mirabilis*. For a discussion of the subspecies of *P. hastatus* and the species of *Strebla* that parasitize them, see Wenzel and Tipton (1966:682-687).

The records from *Phyllostomus elongatus* are of special interest, since, as noted above, these bats do not appear to be parasitized by any parasites that are specific to them, but by species that are common parasites of other hosts.

Strebla cormurae, new species

(Fig. 63B)

Strebla cormurae is slightly larger than *S. alvarezi* Wenzel and, except for the shape of the male postgonites, is almost indistinguishable from that species in form, structure, and chaetotaxy. In *S. cormurae* the distal portion of the postgonites is strongly curved at right angles to the long axis. In *alvarezi* the postgonites are only moderately bent, at about 45° from the long axis. The description of *S. alvarezi* Wenzel applies equally well to *cormurae*, and the following includes only exceptions and additions to that description.

DESCRIPTION

With the general characters and chaetotaxy of *Strebla alvarezi* Wenzel (1966:625), but slightly larger. As in *alvarezi*, the bare longitudinal area on each side of the mesosternum extends about midway between meso- and metacoxae. *Abdomen.* FEMALE. Seventh sternites each with 8-9 setae, 6-7 of these being macrosetae, 1 or 2 of them longer than the others but not longer than maximum width of sternite (similar in *alvarezi* but 4-5 of the setae short, 1 or 2 of the macrosetae a little longer than maximum width of sternite). MALE. Postgonites strongly curved, the apical portion at right angles to the long axis; very similar to those of *S. proxima* (Fig. 60B) but a little longer and more slender.

MEASUREMENTS

	Males	Females
BL	1.90-2.12	1.95-2.02
TL	0.65-0.71	0.70-0.73
WL	1.36-1.43	1.50-1.59
WW	0.70-0.72	0.70-0.76

TYPE DATA: Male holotype and female allotype ex *Cormura brevirostris* (FMNH 95357), Suriname, Saramacca, Nickerie, Wilhelmina Mts., West River, I-62, H. A. Beatty (FMNH Guianan Zool. Exped., 1960-62). PARATYPES —SURINAME: 2 males and 1 female, same data as the holotype; 5 males and 5 females, same data as the holotype but X-61. VENEZUELA. T. F. AMAZONAS: 1 male and 1 female ex 1 *Cormura brevirostris*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 19-I-67.

Strebla curvata, new species

(Fig. 60D, 63F)

Strebla carolliae Wenzel, 1966:619, in part (paratype from El Salvador)

Strebla curvata is most similar to *S. guajiro*, but smaller, with distinctly shorter dorsolateral abdominal connexival setae, more numerous setae on tergum 9 of the male, fewer setae on the seventh sternites of the female (7-10 as opposed to ± 15), and 7 as opposed to 6 setae on the anterior division of each laterovertex. It is also similar to *S. harderi* n. sp. (see below) but is distinguishable from that species by the characters given in the key. The following description includes chiefly characters by which *curvata* differs from *guajiro* or which were not mentioned in the description of that species (as *carolliae* Wenzel, 1966:619).

DESCRIPTION

Smaller than *Strebla guajiro*. *Head.* Postvertex as in *guajiro*; anterior division of each laterovertex with 7 setae, not including the seta inserted above the eye (which is on the posterior

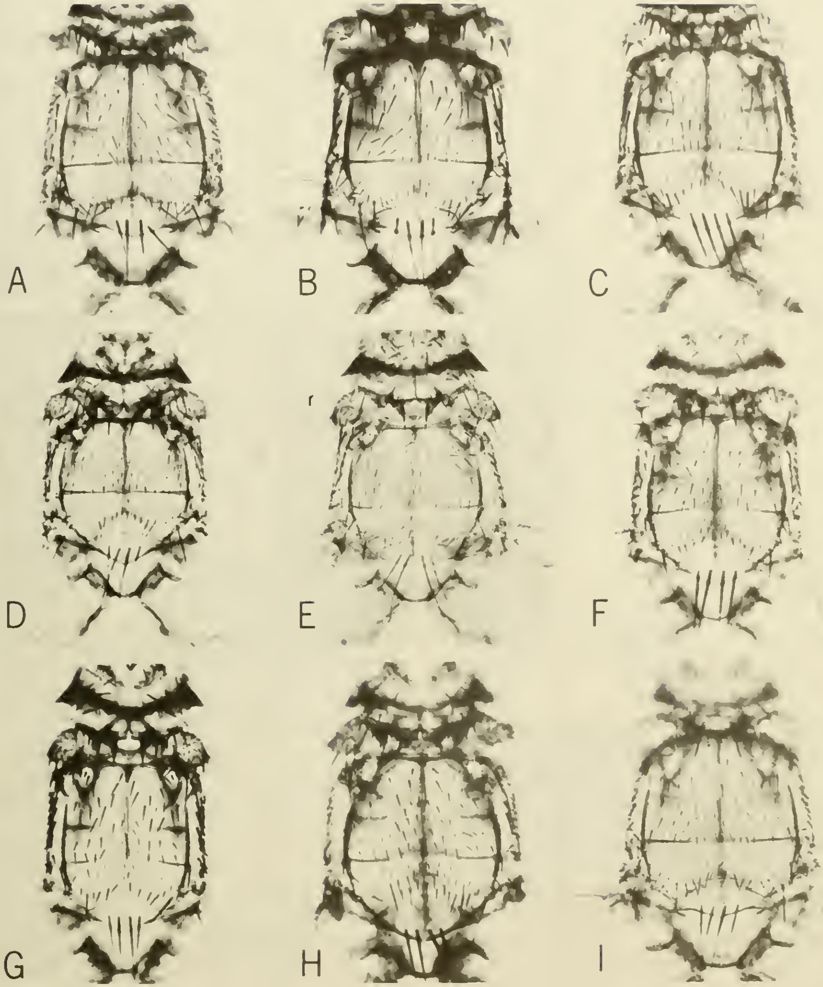

Fig. 63. Thorax, dorsal view: A, *Strebla proxima,* new species, female (SVP 14936); B, *Strebla eormurae,* new species, male (FMNH 95357); C, *Strebla harderi,* new species, female (SVP 8336); D, *Strebla matsoni,* new species, male (SVP 16870); E, *Strebla altmani* Wenzel, male; F, *Strebla curvata,* new species, female (SVP 9343); G, *Strebla alvarezi* Wenzel, male; H, *Strebla obtusa,* new species, female (SVP 7448); I, *Strebla asternalis,* new species, male (SVP 16779). E, G from Wenzel et al. (1966).

division); detached frontoclypeal plates rectangular, either slightly longer than broad or square. *Thorax.* Chaetotaxy as in *guajiro*. *Abdomen.* Dorsolateral connexival setae distinctly shorter than in *guajiro*, of about the same length as the ventromedial setae, those of the female not nearly as long as the shorter anterodorsal setae of the lateral lobes of tergum 1 + 2. Sternum 2 with ± 10 marginal setae, all longer than the discals, about 4 of them longer macrosetae. FEMALE. Tergum 7 teardrop shaped, similar to that of *guajiro* but usually not as strongly narrowed anteriorly. Seventh sternites short, transverse, subreniform, with ±7 setae, including 4 macrosetae, one of these shorter than the others. Ventral arc with a short triangular lobe. MALE. Sternum 5 broadly emarginate posteriorly, the lateral portions with 2 transverse rows of discal setae; posterior margin with from 14-16 setae of which 6-10 may be macrosetae, the others shorter but longer than the discals. Sternum 7 + 8 with a single very long dorsolateral macroseta on each side. Tergum 9 on each side with 3-4 laterodistal macrosetae, the lower one shortest; anterior to these are 5-8 other short setae (4 in *guajiro*). Postgonites similar to those of *guajiro* but more evenly and less strongly curved, the ventral setae inserted slightly more distad.

MEASUREMENTS

	Males	Females
BL	2.02-2.14	2.00-2.48
TL	0.71-0.80	0.76-0.85
WL	1.35-1.48	1.52-1.62
WW	0.68-0.74	0.74-0.79

TYPE DATA: Male holotype ex *Glossophaga soricina* (SVP 9276), Venezuela, Bolívar, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 13-VI-66 and female allotype, same host (SVP 9406), same locality data but Km 67, 16-VI-66. PARATYPES—VENEZUELA. APURE: 1 female ex 1 *Noctilio labialis*, 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 14-XII-65; 2 males and 2 females ex *Glossophaga longirostris*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 6-9-XII-65. BARINAS: 1 female ex 1 *Carollia brevicauda*, 4 males ex 2 *Carollia perspicillata*, 2 km SW Altamira, Altamira, 620 m, 27-28-XII-67. BOLÍVAR: 1 female ex *Glossophaga soricina*, 56 km SE El Dorado, Km 67, El Manaco, 150 m, 16-VI-66; 2 males and 2 females, same host and locality data as the holotype but 13-21-VI-66; 1 male and 2 females, same host, 20 km W La Paragua, Hato San José, 300 m, 4-7-IV-67. FALCÓN: 1 male ex *Glossophaga soricina*, 14 km ENE Mirimire, nr. La Pastora, 122 m, 11-XI-67; 3 males and 2 females, same host, 16 km ENE Mirimire, nr. La Pastora, 70 m, 28-XI–1-XII-67; 2 males, same host, 13 km ESE Mirimire, nr. San Pablo, 270 m, 17-XI-67; 2 males and 1 female ex *Glossophaga longirostris*, 20 km NNE Mirimire, nr. Aguide, 1-5 m, 13-XI-67. GUAJIRA: 1 male ex *Glossophaga longirostris*, 44 km NNE Paraguaipoa, nr. Cojoro, 50 m, 28-VI-68. NUEVA ESPARTA: 1 male ex *Glossophaga longirostris*, 3 km NNE La Asunción, Isla Margarita, 37 m, 7-I-67; 1 male and 1 female, same host, 3 km S La Asunción, Isla Margarita, 53-57 m, 31-I–2-II-67. MIRANDA: 2 males and 3 females ex *Glossophaga soricina*, Birongo, 60 m, 22-23-I-68. MONAGAS: 1 female ex *Glossophaga soricina*, 55 km SSE Maturín, Hato Mata de Bejuco, 18 m, 3-VI-68. T. F. AMAZONAS: 1 male ex *Glossophaga longirostris*, 20 km S Pto. Ayacucho, Las Queseras, Pto. Ayacucho, 135 m, 27-IX-67; 2 males, same host, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 4-X-67; 5 males and 1 female ex *Glossophaga soricina*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 2-3-I-67; 5 males and 5 females, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 6-27-VII-67; 3 males, same host, Río Orinoco, Tamatama, 135 m, 2-4-V-67.

OTHER MATERIAL EXAMINED

El Salvador, Morazan: 1 female (Senckenberg Museum, paratype of *Strebla carolliae* Wenzel) ex *Glossophaga soricina leachii*, Mineral Encuentro, 19-VI-53, H. Felten.

HOST ASSOCIATIONS

Of 63 specimens of *Strebla curvata* that were collected by the survey teams, 57 (90.5 percent) were from species of *Glossophaga*, 33 (52.4 percent) ex 34 *Glossophaga soricina*, and 14 (22 percent) ex 12 *G. longirostris*. Of the remaining 6 specimens, 4 (6.3 percent) were from 2 *Carollia perspicillata*, 1 ex *C. brevicauda*, and 1 ex *Noctilio labialis* (!). It is interesting that this new species—which is so similar to S. *guajiro*, the characteristic species of *Strebla* on species of *Carollia*—was occasionally taken from species of *Carollia* in Venezuela, but not together with S. *guajiro*. *Strebla curvata* was not taken from *Glossophaga soricina* in Panama, although S. *guajiro* was (Wenzel loc. cit.).

REMARKS

The number and length of the setae on posterior margins of sternum 2 in both sexes, and of sternum 5 of the male, vary greatly in *S. curvata*, *S. guajiro*, and *S. harderi*. In general, they are not apt to be quite as long and strong in *curvata* and in *harderi* as they are in *guajiro*. Further, these two species are usually less strongly pigmented thin is *guajiro*.

Strebla curvata is the first species of the genus *Strebla* that appears to be a characteristic parasite of bats of the genus *Glossophaga*.

Strebla diaemi Wenzel

(Fig. 58A, 59C, 62D)

Strebla diaemi Wenzel, 1966:599, Fig. 124A, 125C, 127A

VENEZUELAN SURVEY RECORDS (57 males, 44 females ex 13 *Desmodus youngi*)

FALCÓN: 1 female, 80 km NW Carora, Río Socopito, 480 m, 25-V-68.

SUCRE: 14 males and 13 females, 21 km E Cumaná, 1 m, 20-23-XII-66; 1 male and 3 females, 9 km NE Güiria, Ensenada Cauranta, 4 m, 5-VI-67.

T. F. AMAZONAS: 6 males and 1 female, 14 km SSE Pto. Ayacucho, Chaparito, Pto. Ayacucho, 119 m, 2-X-67; 15 males and 3 females, 28 km S Pto. Ayacucho, Guayabal, Pto. Ayacucho, 135 m, 7-X-67; 20 males and 22 females, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 17-18-VII-67.

ZULIA: 1 male and 1 female, 42 km WNW Encontrados, El Rosario, 24 m, 4-III-68.

HOST ASSOCIATIONS

Desmodus youngi is the only host known for *Strebla diaemi.*

Strebla diphyllae Wenzel

(Fig. 58C, 61A)

Strebla diphyllae Wenzel, 1966:613, Fig. 124C, 133.

Although *Strebla diphyllae* was not recovered from the 11 specimens of the type host, *Diphylla ecaudata*, that were collected by the survey teams, I believe that it will be found in Venezuela. Since describing this species, I have received additional specimens from Colombia (Vaupes: Río Inirida, Cerro de la Pinturas) and Brazil (Para: Río Gurupi, Caninde). Wenzel et al. (loc. cit.) reported specimens of a supposedly new species from *Diphylla* that were collected from *Diphylla ecaudata* in Aragua (Rancho Grande, El Limón). These proved to be *S. mirabilis*.

Strebla galindoi Wenzel

(Fig. 57D, 58F, 59D, 61D)

Strebla galindoi Wenzel, 1966:604, Fig. 123D, 124F, 125D, 130

VENEZUELAN SURVEY RECORDS (33 males, 27 females)

APURE: 1 male and 1 female ex *Tonatia bidens*, 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 14-XII-65; 1 male, same host, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 24-I-68.

BOLÍVAR: 2 females ex *Tonatia bidens*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 22-VI-66.

FALCÓN: 28 males and 20 females ex *Tonatia bidens*, 1 female ex *Sturnira lilium*, 19 km NW Urama, Km 40, Urama, 25 m, 25-X–4-XI-65.

MIRANDA: 2 males and 2 females ex *Tonatia bidens*, Birongo, 60 m, 23-I-68.

T. F. AMAZONAS: 1 male and 1 female ex *Tonatia bidens*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 10-IV-67.

HOST ASSOCIATIONS

The 59 specimens of *Strebla galindoi* collected by the survey teams were taken from 10 *Tonatia bidens*, the only host known for this streblid.

Strebla guajiro (Garcia and Casal), new combination

(Fig. 56A)

Euctenodes guajiro Garcia and Casal, 1965:14, Fig. 10-16

Euctenodes mirabilis, authors (part) not Waterhouse, new synonym

Strebla carolliae Wenzel, 1966:619, Fig. 122A, 136, new synonym

The female type of *Strebla guajiro* was collected in Venezuela, (Aragua: Campamento Rangel) on *Noctilio labialis labialis* (!) together with the male allotype and seven female and six male paratypes. Although I have not seen any of the type material, it is clear from the excellent illustrations of *S. guajiro* that it is conspecific with *S. carolliae* Wenzel. The host given for the type series of *guajiro* is almost certainly in error. I have never seen a confirmed record of any species of *Strebla* from either of the two species of *Noctilio*. *Strebla guajiro* is a characteristic parasite of species of *Carollia*, and in some areas, e.g., Panama, it has been reported (Wenzel et al., loc. cit.) from *Glossophaga soricina.*

In their table (loc. cit., p. 10) summarizing the known hosts of species of *Euctenodes*, Garcia and Casal also list "leaf nosed short tailed" bat as an additional host for *E. guajiro*.

Venezuelan Survey Records (343 males, 242 females, 1 sex undet.)

This common parasite of species of *Carollia* was taken at 76 localities in 13 states, as follows: Apure (3 localities, 24-76 m); Barinas (5 localities, 611-1,070 m); Bolívar (10 localities, 150-1,042 m); Carabobo (6 localities, 25-1,537 m); Falcón (8 localities, 2-1,260 m); Guárico (2 localities, 470-630 m); Miranda (5 localities, 1-1,180 m); Monagas (4 localities, 18-1,345 m); Sucre (4 localities, 1-380 m); T. F. Amazonas (14 localities, 114-155 m); Trujillo (4 localities, 90-164 m); Yaracuy (2 localities, 25-400 m); and Zulia (8 localities, 37-270 m).

Other Venezuelan Material Examined

ARAGUA: 1 sex undet. ex *Carollia perspicillata*, Rancho Grande (El Limón), 30-III-60, C. O. Handley, Jr.

MONAGAS: 2 males and 2 females ex *Carollia p. perspicillata*, Guacharo Cave ("Cerro de la Cueva"), 900 m, 16-VIII-62, J. Ojasti.

Host Associations

Of 586 specimens of *Strebla guajiro* collected by the survey teams, 523 (89.2 percent) were from 348 *Carollia perspicillata*, 51 (8.7 percent) ex 47 *C. brevicauda*, 3 (0.51 percent) ex 3 *Carollia* sp., and the remaining 9 specimens were from 9 bats of 9 species. These 9 are probably contaminants or represent transitory transfers. Of the specimens from *C. brevicauda*, 47 (92 percent) were taken at elevations above 600 meters.

Remarks

I am unable to distinguish between specimens of *Strebla guajiro* from *Carollia perspicillata* and *C. brevicauda*, but further studies may demonstrate that they are specifically distinct, as is true for the alloxenous species of *Speiseria* and *Trichobius* that parasitize these two hosts in Venezuela and elsewhere.

Strebla harderi, new species

(Fig. 60E, 63C)

Strebla harderi is very similar to *S. guajiro* and *S. curvatus*. It is distinctive in its large female seventh sternites with 17-18 setae and, especially, the very long slender male postgonites. It also differs from these species in that the longitudinal bare area on each side of the mesosternum extends posteriorly only a little beyond the procoxal cavity rather than to nearly midway between pro- and mesocoxal cavities.

The following description includes characters by which *S. harderi* differs from *S. guajiro*, or which were not in my original description of *carolliae* (= *guajiro*).

Description

Head. Anterior division of each laterovertex with 6 setae as in *guajiro;* detached frontoclypeal plates longer than broad. *Thorax.* Chaetotaxy as in *guajiro*. Female. Dorsolateral abdominal connexival setae longer than the medioventral ones, but not nearly as long as anterodorsal setae on lateral lobes of tergum 1+2. Tergum 7 longer than in *guajiro* and *curvatus*, usually elongate-oblong, with the sides feebly converging anteriorly, but these sometimes strongly converging as in those species. Seventh sternites very large, with 17-18 setae, these a mixture of long and shorter ones, 2-3 of them conspicuously longer macrosetae. Male. Sternum 5 posteriorly broadly emarginate, the margin with 14-16 setae of which 11-16 are macrosetae of varying lengths, the others about half as long as the longest macrosetae and distinctly longer than the discals; sternum quite short at middle, as in *curvatus* and *guajiro*, the lateral portions usually with 2 transverse rows of setae. Sternum 7+8 with a single longer dorsolateral macroseta on each side and sometimes a short seta medial to it. Tergum 9 with 4 distolateral macrosetae, the lower one shorter, and 4-5 short setae anterior to these. Postgonites long, slender, strongly curved (Fig. 60E).

Measurements

	Males	Females
BL	1.47-1.65	1.55-1.83
TL	0.54-0.57	0.62-0.68
WL	1.39-1.70	1.64-1.73
WW	0.68-0.75	0.72-0.80

Type Data: Male holotype and female allotype ex *Anoura geoffroyi* (SVP 29349), Venezuela, T. F. Amazonas, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 27-VII-67. Paratypes–VENEZUELA. Bolívar: 1 female ex 1 *Anoura sp.* A, 85 km SSE El Dorado, Km 125, 1,032 m, 18-V-66; 1 male ex *Anoura geoffroyi*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 13-VI-66. T. F. Amazonas: 2 females ex *Anoura geoffroyi*, Cabecera del Caño Culebra, 40 km NNW Esmeralda, 1,200-1,400 m, 7-8-II-67; 2 males, same host and locality data as the holotype.

Host Associations

Strebla harderi is the first species of *Strebla* found to be associated with bats of the genus *Anoura*. The Streblinae that characteristically parasitize bats of this genus and related genera of Glossophaginae—*Lionycteris* and *Lonchophylla*—are species of the genus *Anastrebla* (q.v.).

Remarks

This species is named for Fred L. and Virginia Harder of the Venezuelan Survey field parties.

Strebla hertigi Wenzel

(Fig. 56B, 59F, 62B)

Strebla hertigi Wenzel, 1966:596, Fig. 122B, 125F, 127B

Euctenodes mirabilis, authors (part), not Waterhouse

Venezuelan Survey Records (212 males, 212 females, 7 sex undet.)

BARINAS: 2 males and 4 females ex *Phyllostomus discolor*, 2 km SW Altamira, Altamira, 611-620 m, 26-XII-67–2-I-68.

BOLÍVAR: 6 males and 4 females ex *Phyllostomus discolor*, 150 m, 8-19-VI-66; 2 males, same host, 20 km W La Paragua, Hato San José, 306 m, 10-IV-67.

CARABOBO: 20 males, 31 females and 1 sex undet. ex *Phyllostomus discolor*, 2 km SE Montalbán, Potrerito, Montalbán, 598 m, 31-X–1-XI-67; 1 male, same host, 6 km N Urama, Urama, 60 m, 17-III-66.

DTO. FEDERAL: 3 males ex *Phyllostomus discolor*, nr. El Limón, 48 km W Caracas, Hda. Carapiche, 380 m, 21-VIII-66.

FALCÓN: 3 males ex *Carollia perspicillata*, 19 km NW Urama, Km 40, Urama, 25 m, 25-X-65; 18 males, 11 females, and 1 sex undet. ex *Phyllostomus discolor*, Capatárida, 55 m, 24-25-VI-68; 2 females, same host, 16 km ENE Mirimire, nr. La Pastora, 70 m, 28-XI-67; 14 males and 14 females, same host, 80 km NW Carora, Río Socopito, 470-480 m, 20-22-V-68.

GUÁRICO: 1 male ex *Phyllostomus discolor*, 10 km NE Altagracia, Hda. Elvira, 630 m, 16-IX-66; 3 males and 4 females, same host, 35 km SSW San Juan de los Morros, Hto. Las Palmitas, 181 m, 4-IX-66.

MIRANDA: 1 female ex *Phyllostomus discolor*, 1 km S Río Chico, 1 m, 5-XI-66; 1 female, same host, 7 km E Río Chico, nr. Pto. Tuy, 1 m, 17-XI-66; 3 males and 3 females, same host, Birongo, 60 m, 23-I-68; 2 males and 3 females ex *Phyllostomus hastatus*, Cueva Alfredo Jahn, Birongo, 60 m, 20-I-68.

MONAGAS: 3 males and 1 female ex *Phyllostomus discolor*, 55 km SSE Maturín, Hato Mata de Bejuco, 18 m, 3-VI-68; 2 males and 1 female, same host, 5 km NW Caripe, San Agustín, 1,160-1,165 m, 28-29-VI-67.

NUEVA ESPARTA: 3 males and 2 females ex *Phyllostomus discolor*, 10 km WSW La Asunción, Isla Margarita, 47 m, 4-II-67; 1 female, same host, 3 km S La Asunción, Isla Margarita, 53 m, 16-I-67.

SUCRE: 1 female ex *Sturnira lilium*, 11 males, 7 females, and 1 sex undet. ex *Phyllostomus discolor*, 26 km ESE Carúpano, Manacal, 175-380 m, 27-VII–2-VIII-67; 9 males and 6 females, same host, 9 km NE Güiria, Ensenada Cauranta, 1-7 m, 3-16-VI-67.

T. F. AMAZONAS: 9 males and 7 females ex *Phyllostomus discolor*, 30 km S Pto. Ayacucho, Coromoto, Pto. Ayacucho, 126 m, 11-IX-67; 7 males and 8 females, same host, 33 km S Pto. Ayacucho, El Randal, Pto. Ayacucho, 195 m, 19-20-IX-67; 11 males and 9 females, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-14-IV-67; 16 males and 15 females, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 13-27-VII-67.

TRUJILLO: 1 male ex *Phyllostomus discolor*, 23 km N Valera, nr. Agua Viva, Valera, 164 m, 23-X-65; 4 males and 5 females, same host, 25 km NW Valera, nr. Agua Santa, Valera, 90 m, 7-IX–22-X-65.

ZULIA: 1 female ex *Phyllostomus hastatus*, 1 female ex *Carollia perspicillata*, 33 males, 29 females, and 1 sex undet. ex *Phyllostomus discolor*, 39 km WNW Encontrados, El Rosario, 37 m, 1-IV-66–1-IV-68; 6 males, 8 females, and 1 sex undet., same host, 45 km WNW Encontrados, El Rosario, 37 m, 31-III-68; 4 females, same host, 63 km WNW Encontrados, La Rinconada, El Rosario, 125 m, 28-II–29-IV-68; 12 males and 15 females, same host, 21 km SW Machiques, Kasmera, 270 m, 17-18-IV-68; 3 males and 10 females, same host, 33 km NW La Paz, nr. Cerro Azul, 75 m, 13-VI-68; 4 males, 3 females, and 2 sex undet. ex *Sturnira lilium*, 60 km WNW Encontrados, Boca del Río de Oro, El Rosario, 73 m, 19-III-68.

Host Associations

Of 431 specimens of *Strebla hertigi* collected by the survey teams, 411 (95.3 percent) were from 150 *Phyllostomus discolor*, 10 (2.3 percent) ex 2 *Sturnira lilium*, 6 (1.4 percent) ex 2 *P. hastatus* and 4 (0.9 percent) ex 2 *Carollia perspicillata*. This species commonly occurs on *P. hastatus panamensis* in Central America (Wenzel, et al., 1966:682 pp). The host of the

Venezuelan specimen recorded from *P. hastatus* from Miranda is probably that subspecies. If so, and if the association is not in error, this is the first record of *S. hertigi* from *P. hastatus hastatus*. For a discussion of the host relationships of *S. hertigi*, see Wenzel, et al., 1966:599; Wenzel and Tipton, 1966:682-687.

Strebla kohlsi Wenzel

(Fig. 57C)

Strebla kohlsi Wenzel, 1966:618, Fig. 123C

Venezuelan Survey Records (4 males, 6 females)

FALCÓN: 1 male and 1 female ex 1 *Tonatia bidens*, 19 km NW Urama, Km 40, Urama, 25 m, 4-XI-65.

T. F. AMAZONAS: 1 female ex *Tonatia silvicola*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 3-I-67; 3 males and 4 females, same host, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 30-V–12-VI-67.

Host Associations

The two specimens of *Strebla kohlsi* recorded (see above) from *Tonatia bidens* (SVP 5236) is probably a contaminant. The characteristic (and type) host of *S. kohlsi* is *T. silvicola*. A specimen of *T. silvicola* (SVP 5236) was collected at the same time as the specimen of *T. bidens* from which *S. kohlsi* was taken together with 16 specimens of *S. galindoi*, a characteristic parasite of *T. bidens*.

Remarks

Two of the character states by which *Strebla kohlsi* was separated from *S. mirabilis*, i.e., the more elongate head (partially an artifact of preservation), and the longer detached frontoclypeal plates (variable) are not reliable. It is true that the female seventh sternites have fewer setae (11-12 as opposed to ± 15); but otherwise, from the relatively small amount of material available, I am unable to determine at this time whether or not *S. kohlsi* is a valid species. It may represent a partially isolated population of *S. mirabilis* that occurs on *Tonatia silvicola*.

Strebla machadoi Wenzel

(Fig. 58D, 64D)

Strebla machadoi Wenzel, 1966:607, Fig. 124D, 131B.

Venezuelan Survey Records (12 males, 13 females)

APURE: 1 male ex *Micronycteris minuta*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 31-I-68.

BOLÍVAR: 1 male ex *Micronycteris minuta*, 28 km SE El Manteco, Los Patos, 150 m, 11-IV-66.

LARA: 2 males and 1 female ex *Micronycteris minuta*, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 528 m, 14-VII-68.

MIRANDA: 2 males ex *Micronycteris minuta*, 7 km E Río Chico, nr. Pto. Tuy, 1 m, 5-16-XI-66; 2 females, same host, 13 km SE Caracas, nr. El Encantado, El Encantado, 570 m, 14-I-68.

MONAGAS: 1 female ex *Micronycteris minuta*, 55 km SSE Maturín, Hato Mata de Bejuco, 18 m, 3-VI-68.

SUCRE: 4 males ex *Micronycteris minuta*, 21 km E Cumaná, 1 m, 22-XII-66.

T. F. AMAZONAS: 3 females ex *Micronycteris minuta*, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 4-X-67.

ZULIA: 2 males and 3 females ex *Micronycteris minuta*, 33 km NW La Paz, nr. Cerro Azul, 75 m, 7-15-VI-68; 2 females, same host, 35 km NW La Paz, nr. Cerro Azul, 80 m, 11-VI-68; 1 female ex 1 *Micronycteris schmidtorum*, 40 km NW La Paz, nr. Cerro Azul, 75 m, 7-VI-68.

Host Associations

All 25 specimens of *Strebla machadoi* collected by the survey teams were from species of *Micronycteris*, 24 (96 percent) from 14 *M. minuta* and 1 ex *M. schmidtorum*. The type was from Monagas: Caripe, La Guanote, ex *M. minuta*.

Strebla matsoni, new species

(Fig. 60G, 63D)

Strebla matsoni closely resembles *S. altmani* in most characters, but in *matsoni* the anterior margin of the postvertex is more obtusely angulate (more nearly approaching that of *galindoi*) and the festoon setae of the occipital lobes are longer. The eyes in *matsoni* are larger, with eight rather than six facets, the frontoclypeal plates are more poorly defined, the longitudinal bare areas on each side of the mesosternum extend posteriorly only a little beyond mesocoxal cavities, and the male postgonites are more strongly curved.

Description

Head. Relatively short, ventral ante-ctenidial area definitely broader than long. Frontoclypeal plates fairly large but indistinct. Eyes with 8 rather large facets. Anterior division of laterovertices with 6 setae. Postvertex very similar to that of *altmani* but anterior angle more obtuse, festoon setae of occipital lobes all distinctly longer. Setae of postvertex strong, about as long as median suture of postvertex; festoon setae of occipital lobes slender, the innermost seta a little more than half as long as those on postvertex and fairly strong, but not a spinelet; second seta minute, the third a trifle longer, the fourth longer than setae of postvertex and longer than width of margin of an occipital lobe; the sixth seta short, the seventh about as long as setae of postvertex; outermost seta very short. *Thorax.* Relatively short and broad. Mesonotal chaetotaxy as in Fig. 63D. Prescutal setae rather uniform in size and distribution, but absent from a bare area on each side medial to the epaulet setae, these 4 in number; prescutal arcs poorly defined. Longitudinal mesosternal bare areas extending posteriorly only slightly beyond mesocoxal cavities. *Legs.* Mostly without distinctive characters. Metatibiae with 2 rows of dorsal setae that are distinctly longer than the laterals, but not prominently so, those of the outer row slightly longer than those of the inner; with 2 subapical macrosetae. *Abdomen.* Dorsolateral abdominal connexival setae fairly long, distinctly longer than the lateral and ventral setae, these about as long as the shorter discal setae of sternum 2; the dorsolaterals of the females as long as the long setae of the antescutellar row, those of the males a little shorter. Sternum 2 with ± 26 discal setae, and with ± 10-12 longer setae on apical margin, 1 pair of these conspicuously longer than the others and about 3 times as long as discal setae. Female. Tergum 7 very large, roughly elongate-oval, broader than the supra-anal plate, with a very long macroseta on each side near lateral margin at about apical third, and another pair on distal margin, these about ⅔ as long as the anterior pair. Supra-anal plate with 4 distal macrosetae, lacking discal setae. Seventh sternites very short, transversely elongate, more than twice as wide as long, with ± 9 setae, mostly long, 2 or 3 of them longer than the others. Ventral arc with a small narrow lobe. Male. Sternum 5 rather small, not as wide as abdomen, very short, 2 rows of discal setae toward sides and 1 row along middle; distal margin with ± 12 long setae about 8 of these at least twice as long as sternum, 1 pair distinctly longer than the others. Sternum 7+8 with 3 dorsolateral setae on each side, the outermost one a long macroseta, the other 2 much shorter. Tergum 9 with 2 dorsolateral macrosetae and 3 macrosetae below these on distal margin, 1 or 2 of them very long; anterior to these are ± 8 short setae. Postgonites as in Fig. 60G.

Measurements

	Males	Females
BL	1.66-2.02	1.87-1.97
TL	0.62-0.75	0.66-0.70
WL	1.27-1.51	1.24-1.54
WW	0.60-0.78	0.75-0.80

Type Data: Male holotype (SVP 41654) and female allotype (SVP 41662) ex *Macrophyllum macrophyllum*, Venezuela, Zulia, 56 km WNW Encontrados, El Rosario, 76 m, 10-III-68. Paratypes—VENEZUELA. Apure: 1 female ex *Macrophyllum macrophyllum*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 6-XII-65. Bolívar: 1 male ex *Rhynchonycteris naso*, 4 males ex *Macrophyllum macrophyllum*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 10-24-VI-66; 1 male, same host, 50 km SE El Manteco, Río Supamo, 150 m, 11-IV-66. T. F. Amazonas: 4 males ex *Macrophyllum macrophyllum*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 10-II-67; 5 males and 2 females, same host, 108 km SSE Esmeralda, Río Mavaca, 140 m, 5-10-IV-67. Zulia: 1 female ex 1 *Carollia perspicillata*, 9 males, 2 females, 1 sex undet. ex *Macrophyllum macrophyllum*, 52-61 km WNW Encontrados, El Rosario, 52-76 m, 10-28-III-68.

Host Associations

Of 31 specimens collected by the survey teams, 29 were from 17 *Macrophyllum macrophyllum*. The specimens from *Rhynchonycteris naso* and *Carollia perspicillata* are probably contaminants or transitory transfers.

Interestingly, the characteristic species of *Strebla* on *Macrophyllum* in Panama (Wenzel et al., 1966:624) was *Strebla altmani*, which also occurred there on *Lonchorhina aurita.*

Strebla mirabilis (Waterhouse)

(Fig. 57A, 59E, 62A)

Euctenodes mirabilis Waterhouse, 1879:310

Euctenodes guarani Garcia and Casal, 1965:13, Fig. 4-9, *new synonym*

Strebla mirabilis, Wenzel, Tipton, and Kiewlicz, 1966:615, Fig. 123A, 125E, 134, 135A

I have examined the type of this species. The originally dry specimen, which was remounted in Canada balsam by Jobling in 1934, bears no locality data other than Colombia/ 79.50." Study of the type shows that the interpretation of this species by Wenzel et al. (loc. cit.) is correct.

It is clear from the illustrations of Garcia and Casal (loc. cit.) that the species described by them as *Euctenodes guarani* from "Paraguay, sobre murciélago", is *Strebla mirabilis* Waterhouse.

VENEZUELAN SURVEY RECORDS (146 males, 93 females, 1 sex undet.)

APURE: 2 males ex *Phyllostomus elongatus*, 20 males and 14 females ex *Trachops cirrhosus*, 32 km NE Pto. Páez, La Villa, Hato Cariben, 76 m, 23-28-XII-65; 1 female, same host, 46 km NE Pto. Páez, Río Cinaruco, Hato Cariben, 76 m, 27-XII-65.

BOLÍVAR: 1 male ex *Phyllostomus elongatus*, 11 males and 3 females ex *Trachops cirrhosus*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 13-23-VI-66; 1 female, same host, 5 males and 3 females ex 1 *Phyllostomus hastatus*, 45 km NE Icabarú, Santa Lucia de Surukun, Icabarú, 851 m, 1-2-V-68; 1 female ex *Phyllostomus elongatus*, 70 km SSE El Dorado, Piedra Virgen, Km 125, 229 m, 29-V-66; 10 males and 16 females ex *Trachops cirrhosus*, 20 km W La Paragua, Hato San José, 306 m, 6-III–10-IV-67; 2 females, same host, 85 km SSE El Dorado, Km 125, 875 m, 9-V-66; 1 male and 1 female, same host, 50 km SE El Manteco, Río Supamo, 350 m, 11-IV-66.

CARABOBO: 1 male and 1 female ex *Trachops cirrhosus*, 6 km N Urama, Urama, 60 m, 17-III-66.

FALCÓN: 1 male ex *Artibeus jamaicensis*, 1 female ex 1 *Artibeus lituratus*, 17 males and 4 females ex *Trachops cirrhosus*, 19 km NW Urama, Km 40, Urama, 25 m, 18-28-X-65.

GUÁRICO: 3 males and 2 females ex *Trachops cirrhosus*, 14 km SE Calabozo, nr. Río Orituco, Estaction Biologica de los Llanos, 100 m, 21-22-VIII-68.

T. F. AMAZONAS: 1 male ex *Chiropterus auritus*, 2 males ex *Phyllostomus elongatus*, 37 males, 21 females, and 1 sex undet. ex *Trachops cirrhosus*, 108 km SSE Esmeralda, Río Mavaca, 140 m, 3-14-IV-67; 1 female ex *Artibeus jamaicensis*, 56 km NNW Esmeralda, Caño Culebra, Belén, 150 m, 12-I-67; 1 male ex *Chrotopterus auritus*, 12 males and 5 females ex *Trachops cirrhosus*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 5-27-VII-67; 3 females, same host, 84 km SSE Esmeralda, Boca Mavaca, 138 m, 20-II-66; 1 male and 1 female, same host, 106 km SW Esmeralda, Brazo Casiquiare, Capibara, 130 m, 30-V–2-VI-67; 7 males and 3 females, same host, 33 km S Pto. Ayacucho, El Gavilan, Pto. Ayacucho, 135 m, 11-X-67; 1 male, same host, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 7-IX-67; 2 males and 2 females, same host, 33 km S Pto. Ayacucho, El Raudal, Pto. Ayacucho, 195 m, 20-IX–5-X-67.

YARACUY: 4 males and 1 female ex *Trachops cirrhosus*, 11 km NW Urama, El Central, Urama, 25 m, 15-III-66.

ZULIA: 5 males and 6 females ex *Trachops cirrhosus*, 60 km WNW Encontrados, Boca del Río de Oro, El Rosario, 73 m, 17-III-68; 1 male ex 1 *Carollia perspicillata*, 39 km WNW Encontrados, El Rosario, 37 m, 31-III-68.

OTHER VENEZUELAN MATERIAL EXAMINED

ARAGUA: 6 specimens ex *Diphylla ecaudata*, Rancho Grande, El Limón, 30-III-60, C. O. Handley, Jr.

HOST ASSOCIATIONS

Of 240 specimens of *Strebla mirabilis* collected by the survey teams, 220 (91.6 percent) were from 85 *Trachops cirrhosus*, 8 (3.3 percent ex 1 *Phyllostomus hastatus*, and 6 (2.5 percent) ex 5 *Phyllostomus elongatus*. The remaining 6 were from 6 bats of 4 species. For a discussion of the host relationships of this species, see Wenzel and Tipton (1966: 683 ff.).

REMARKS

Strebla mirabilis, *S. kohlsi*, and *S. paramirabilis* n. sp. are very similar. Specimens of *mirabilis* from *Phyllostomus hastatus*, *P. elongatus*, and *Trachops cirrhosus* appear to be the same. Statistical analyses of specimens taken from bats of these two genera in Central America has revealed no significant differences. *Strebla kohlsi*, from *Tonatia silvicola*, differs in some minor characters of chaetotaxy but otherwise is very similar to and may be a synonym of *mirabilis*. *Strebla paramirabilis*, which occurs on species of *Artibeus* and *Vampyrops* in Venezuela, is also very similar to *mirabilis*. Specimens taken from these genera of bats in Colombia are very similar to *paramirabilis*, but smaller and with fewer setae on the seventh sternites. These may represent still another species.

Strebla obtusa, new species

(Fig. 60 A, 63H)

This interesting new species is distinctive in the following combination of characters: the shape of the postvertex, the very short festoon setae of the postvertex and occipital lobes, the single elongate hyaline lens of the eye, the extraordinarily long pair of macrosetae on the seventh sternites of the female, the apically feebly curved postgonites of the male, and longer setae in single row and two macrosetae on dorsal edge of the metatibiae. In the shape of the postvertex, it superficially resembles *Strebla hertigi*, and in having a single elongate hyaline eye lens it resembles *S. tonatiae*, *S. hoogstraali*, and S. *machadoi.* From the first two, it differs in having conspicuous detached frontoclypeal plates; from *machadoi,* which has detached frontoclypeal plates, it differs in having a very differently shaped postvertex, short festoon setae on postvertex and occipital lobes, and curved male postgonites.

DESCRIPTION

Head. Rather elongate, ante-ctenidial area a little longer than broad. Detached occipital plates irregularly rectangular about as long as broad. Anterior division of laterovertices with 8 setae, only the posterior ones long, the others either short or of moderate length, and stout. Eyes a single elongate hyaline lens. Postvertex as in *hertigi,* but the anterior margin a little more pointed at middle; setae of postvertex rather short, about as long as each posterior division of postvertex is wide, or a little longer. Occipital lobes with several very short spinelets on inner subdivision, the innermost one less than half as long as that on postvertex; 3 setae of the outer subdivision about as long as the postvertex setae, except the middle one which is short like the inner occipitals. *Thorax.* Chaetotaxy as in Fig. 63H. Epaulets consisting of 4 short, stout setae; prescutal arcs not well defined, their setae slightly longer than the discals; several discal setae present anterior to the arcs on each side; interval between prescutal sutures laterally with 3 transverse rows of setae. Scutum with ± 28 short discal setae and 16-17 much longer antescutellar setae. Longitudinal bare areas of mesosternum extending to about midlength of mesosternum. *Legs.* Mostly without distinctive characters. Dorsal edge of metatibiae with an outer row of setae that are longer than the others and become longer distally; with 2 very long conspicuous macrosetae, these about as long as the first 2 tarsal segments combined, 1 inserted just beyond middle, the other more distally. *Abdomen.* Sternum 2 with a broad sparsely setose area which extends anteriorly only a little beyond middle, the more posterior setae longer and stronger than the anterolateral ones; posterior margin with 15-17 longer, somewhat stouter setae, the median ones tending to be longer and usually with 1 pair of widely separated setae which are distinctly longer than the others. FEMALE. Dorsolateral connexival setae long, especially basally and distally, most of them as long as the apical macrosetae of the supra-anal plate, and about twice as long the the ventral connexival setae, these generally as long as or longer than the longest distal setae of sternum 2. Supra-anal plate elongate-oval, with a pair of macrosetae and, posterior to them, a pair of shorter, more closely placed setae similar to a pair or more of discal setae on supra-anal plate. Seventh sternites transverse, relatively small, oboval; with about ± 12 setae, those along distal and lateral margin quite short, of about same length as ventral connexival setae, though 1 setae is about twice as long as the longest of these, and 2 are extraordinarily long, strong macrosetae which are about twice as long as width of sternites. MALE. Connexival setae similar to those of the female but the ventrals about as long as the shortest discal setae on sternum 2. Sternum 5 with 3 transverse rows of distal setae similar to the ventral connexivals, sometimes with only 2 rows at middle; apical margin with 16-18 longer setae, mostly at least twice as long as discals and usually with at least 1 pair of setae that are distinctly longer than the others and longer than sternum. Sternum 6 and ventral arms of sternum 7+8 very well developed. Sternum 7+8 with a single dorsolateral macrosetae on each side. Tergum 9 on each side with 1 pair of dorsal macrosetae and 1 or 2 others along laterodistal margin; anterior to these are 6-10 short setae, and near ventral margin there is an exceptionally long macrosetae, this longer than tergum 9 viewed from below.

MEASUREMENTS

	Males	Females
BL	2.02-2.22	2.20-2.39
TL	0.71-0.82	0.68-0.79
WL	1.35-1.49	1.41-1.56
WW	0.70-0.79	0.72-0.84

TYPE DATA: Male holotype and female allotype ex *Micronycteris nicefori* (SVP 7443), Venezuela, Bolívar, 25 km SE El Manteco, Los Patos, 150-350 m, 5-IV-66. PARATYPES—VENEZUELA. BOLÍVAR: 10 males and 8 females, same data as holotype; 1 male and 1 female ex *Phyllostomus elongatus,* same locality data as the holotype but 150 m. MIRANDA: 1 female ex *Micronycteris nicefori,* Birongo, 60 m, 23-I-68. T. F. AMAZONAS: 2 males ex *Micronycteris nicefori,* 84 km SSE Esmeralda, Boca Mavaca, 138 m, 14-III-67; 2 males, same host, 25 km S Pto. Ayacucho, Paria, Pto. Ayacucho, 114 m, 19-IX-67; 1 male, same host, 108 km SSE Esmeralda, Río Mavaca, 149 m, 10-IV-67; 3 females, same host, Río Orinoco, Tamatama, 135 m, 27-IV-67.

HOST ASSOCIATIONS

Of 31 specimens of *Strebla obtusa* collected by the survey teams, 29 (93.5 percent) were from 18 *Micronycteris nicefori*, the other 2 specimens were taken from 2 *phyllostomus elongatus.*

Strebla paramirabilis, new species
(Fig. 60C, 64F)

This species differs from *Strebla mirabilis* and *S. kohlsi* in lacking a pair of shorter discal setae on the female supra-anal plate, in the smaller number of setae (± 11 as opposed to 16-17) on each side of the male tergum 9, in having evenly curved rather than angulately bent postgonites, and in being a parasite of fruit-eating bats of the subfamily Stenodermatinae rather than of Phyllostominae.

DESCRIPTION

With the characters of *Strebla mirabilis* and *S. kohlsi* except as follows. FEMALE. Abdominal connexival setae slightly shorter than in *mirabilis.* Supra-anal plate with 4 macrosetae only, lacking a pair of shorter discal setae. Seventh sternites with 15-16 setae, mostly macrosetae of varying lengths, 2-3 of them conspicuously longer than the others. MALE. Each side of sternum 7+8 with 1 very long dorsolateral macroseta and usually a short seta medial to this. Tergum 9 with ± 11 setae on each side; 5 long macrosetae, including 2 more slender dorsomedial ones, and 3 on laterodistal margin, the most ventral seta shortest; and ± 6 short setae anterior to the lateral macrosetae. Postgonites evenly curved.

MEASUREMENTS

	Males	Females
BL	2.08-2.34	2.30-3.10
TL	0.79-0.89	0.86-0.96
WL	1.63-1.82	1.90-2.07
WW	0.83-0.92	0.85-1.02

TYPE DATA: Male holotype and female allotype ex *Artibeus jamaicensis* (SVP 16052), Venezuela, T. F. Amazonas, Cabacera del Caño Culebra, 40 km NNW Esmeralda, 1,140 m, 2-7-II-67. PARATYPES—VENEZUELA. BOLÍVAR: 3 males and 3 females ex *Vampyrops aurarius*, 1 female ex *Artibeus jamaicensis*, 85 km SSE El Dorado, Km 125, 916-1,032 m, 5-26-V-66; 1 male and 1 female, same host, 21 km NE Icabarú, El Pauji, Icabarú, 851 m, 5-7-V-68. T. F. AMAZONAS: 1 male ex 1 *Anoura geoffroyi*, 8 males and 4 females ex *Artibeus jamaicensis*, same locality data as the holotype; 4 males and 2 females ex *Vampyrops aurarius*, 2 males ex *Artibeus jamaicensis*, Caño Culebra, 50 km NNW Esmeralda, Cerro Duida, 700-800 m, 11-19-I-67; 4 females, same host, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 1-II-67. ZULIA: 1 male and 2 females ex 2 *Artibeus* sp. D, 21 km SW Machiques, Kasmera, 270 m, 15-IV-68.

HOST ASSOCIATIONS

Of 39 specimens of *Strebla paramirabilis* collected by the survey teams, 23 (60 percent) were from 11 *Artibeus jamaicensis*, 12 (31 percent) ex *Vampyrops aurarius*, 3 (7.7 percent) ex 2 *Artibeus* sp. D, and 1 ex *Anoura geoffroyi.*

Strebla proxima, new species
(Fig. 60B, 63A)

Strebla proxima is easily separated from all other species by its unusual detached frontoclypeal plates. These are unique among known species in being shaped like commas or parentheses. The long, slender, strongly curved male postgonites superficially resemble those of *harderi* but are not as long and are more strongly, downwardly curved for nearly half their length. The female tergum 7 is unique in having 3 rather long setae at apex, in addition to the more anterior pair of macrosetae.

DESCRIPTION

Head. Elongate, ventral ante-ctenidial area distinctly longer than broad. Eyes multifaceted. Postvertex variable in shape, sometimes resembling that of *machadoi* though somewhat longer and narrower anteriorly, and sometimes that of *hoogstraali*; most festoon setae stout and spine-like, those of postvertex about as long as width of postvertex; first 5 setae of posterior margin of occipital lobes are spinelets, the inner and outermost ones a little longer than the 2 between them. The next seta longer, attenuate, followed by 1 very short seta and 1 that is a little longer. *Thorax.* Chaetotaxy as in Fig. 63A. Epaulets with 4 strong setae. Prescutal arc usually consisting of 5 longer setae, each continued anteriorly by 2 additional shorter setae; interval between prescutal sutures laterally with 3 transverse rows of setae, the middle "row" with only 2 setae. Scutum with ± 34 setae and an antescutellar row of about ± 12 setae, most of them twice as long as the discals. Longitudinal bare areas on each side of mesosternum extending beyond procoxae but not reaching midlength of sternum. *Legs.* Mostly without distinctive characters. Dorsal setae of metatibiae not conspicuously longer than the others, although those of outer row do become a little longer apically; 2 slender, not very long macrosetae on apical fifth. *Abdomen.* Abdominal connexival setae short, sub-

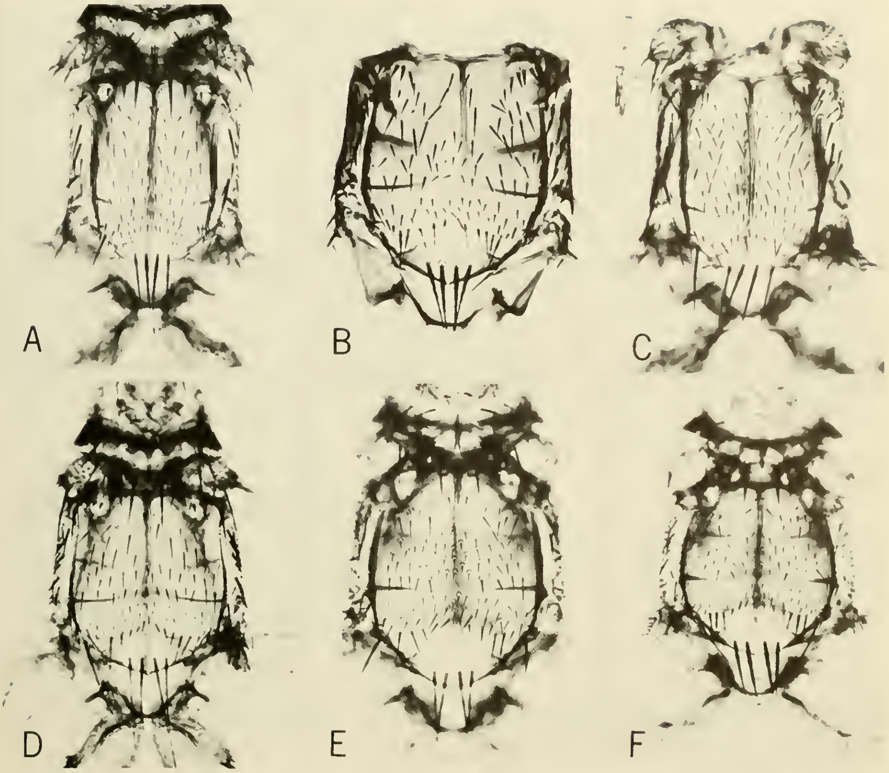

Fig. 64. Thorax, dorsal view: A, *Strebla hoogstraali* Wenzel; B, *Strebla guajiro* (Garcia and Casal); C, *Strebla tonatiae* (Kessel); D, *Strebla machadoi* Wenzel; E, *Strebla chrotopteri*, new species, female (SVP 29319); F, *Strebla paramirabilis*, new species, female (SVP 8845).

equal, mostly of about same length as discal setae of sternum 2, which has ± 27 short discal setae and ± 12 setae along posterior margin; of these, the median 4 are generally shorter, and not much longer than the discals; the others are at least two or three times as long, 1 pair usually distinctly longer than the others. FEMALE. Tergum 7 long, somewhat lanceolate, rather evenly tapered anteriorly, with a pair of macrosetae at about apical third and on distal margin, and 3 shorter setae on distal margin, these at least ½ to ⅔ as long as the 4 distal macrosetae of supra-anal plate, which lacks discal setae (1 pair of macrosetae of supra-anal plate may be inserted anterior to the others). Seventh sternites fairly large, with ± 12 setae of varying lengths, including at least 1 pair of rather long macrosetae. Sternum 5 with ± 12 setae, the 2 median setae usually no longer than the longer discals, about 4 or 5 on each side being macrosetae, the outer ones shorter, the inner pair usually longer than the others. Sternum 7+8 with a single dorsal slender macroseta on each side. Tergum 9 with 1 pair of slender dorsolateral macrosetae on each side; distal margin with 4 or 5 setae, the most dorsal seta fairly short, the next 2-3 much longer, and the 2 ventral ones shorter; anterior to these, ventrally, are 1-3 short setae, the most posterior one longer. Postgonites very slender and strongly curved on distal half, the apical half at right angles to the long axis.

Measurements

	Males	Females
BL	2.04-2.48	2.09-2.62
TL	0.76-0.83	0.78-0.88
WL	1.55-1.63	1.70-1.79
WW	0.69-0.83	0.74-0.85

Type Data: Male holotype and female allotype ex *Peropteryx trinitatis* (SVP 1496), Venezuela, Falcón, 13 km ESE Mirimire, nr. San Pablo, 270 m, 17-XI-67. Paratypes—VENEZUELA. Falcón: 1 female ex 1 *Peropteryx kappleri*, 6 km ENE Mirimire, Cerro Caridad, 260 m, 26-XI-67; 9 males and 5 females ex *Peropteryx macrotis*, 4 males and 3 females ex *Peropteryx trinitatis*, same locality data as the holotype. T. F. Amazonas: 2 males ex *Peropteryx macrotis*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 18-VII-67. Yaracuy: 10 males and 1 female ex *Peropteryx macrotis*, 2 males ex *Peropteryx trinitatis*, 20 km NW San Felipe, Minas de Aroa, 390-400 m, 14-16-XII-67.

Host Associations

Of 39 specimens of *Strebla proxima* collected by the survey teams, all were from species of *Peropteryx*—27 (69 percent) ex 10 *P. macrotis*, 11 (28 percent) ex 4 *P. trinitatis*, and 1 ex 1 *P. kappleri*.

Strebla tonatiae (Kessel)

(Fig 64C)

Euctenodes tonatiae Kessel, 1924:411, Fig. 7-9. —Garcia and Casal, 1965:11, Fig. 1-3

Strebla tonatiae, Wenzel, Tipton, and Kiewlicz, 1966:602, Fig. 129A

Venezuelan Survey Records (30 males, 28 females)

APURE: 1 male ex 1 *Sturnira lilium*, 10 males and 8 females ex *Tonatia brasiliensis*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24-135 m, 17-I—1-II-68.

BOLÍVAR: 1 male ex *Tonatia brasiliensis*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 13-VI-66.

FALCÓN: 1 male and 3 females ex *Tonatia brasiliensis*, 19 km NW Urama, Km 40, Urama, 25 m, 20-27-X-65.

MONAGAS: 2 males and 2 females ex *Tonatia brasiliensis*, 55 km SSE Maturín, nr. Río Tigre, Hato Mata de Bejuco, 36 m, 5-VIII-66.

T. F. AMAZONAS: 2 females ex 1 *Tonatia carrikeri*, 7 males and 9 females ex *Tonatia brasiliensis*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 24-28-VII-67; 1 male, same host, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 8-X-67.

TRUJILLO: 5 males and 4 females ex *Tonatia brasiliensis*, 19 km N Valera, nr. Agua Viva, Valera, 164 m, 15-IX-65.

YARACUY: 1 male ex *Tonatia brasiliensis*, 11 km NW Urama, El Central, Urama, 25 m, 15-III-66.

ZULIA: 1 male ex *Tonatia brasiliensis*, 39 km WNW Encontrados, El Rosario, 37 m, 31-III-68.

Host Associations

Of 58 specimens of *Strebla tonatiae* that were collected by the survey teams, 55 (95 percent) were from the type host, *Tonatia brasiliensis*. The record from *T. carrikeri* may be in error. In sorting the specimens, I was aware that I may have mistakenly labeled a vial of *S. tonatiae* with the host number of *T. carrikeri* rather than of *T. brasiliensis*. The specimen from *Sturnira lilium* is almost certainly a contaminant.

Remarks

I have examined the type of *Strebla tonatiae* and find it to be the species which Wenzel et al. (loc. cit., p. 602) have interpreted as that species, Garcia and Casal (loc. cit.) incorrectly figured the bare area on the mesosternum as extending to apex, but it actually extends only to about midlength. In the type, the area beyond midlength is denuded—though the sockets of the setae can be detected—so that the bare area appears to extend the entire length of the sclerite.

Strebla wiedemanni Kolenati

(Fig. 57B, 59B, 61B)

Hippobosca vespertilionis Fabricius, 1805:339. Suppressed by IZCN, 1936:29

Strebla wiedemannii Kolenati, 1856:46 (nom. nov.).—Wenzel, 1970:100.15 (emend.)

Euctenodes tupi Garcia and Casal, 1965:16, Fig. 17-22. *New synonym*

?*Euctenodes mirabilis*, Garcia and Casal, 1965: 16, Fig. 23-29, not Waterhouse 1879

Strebla vespertilionis, Wenzel, Tipton, and Kiewlicz, 1966:609, Fig. 123B, 125B, 132

I have not seen the type of *Euctenodes tupi* Garcia and Casal, nor the specimen which they recorded as *E. mirabilis* Waterhouse. It is clear from their illustrations (loc. cit.) that *E. tupi*—described from *Desmodus rotundus rotundus*, M. Alegre, Sao Paulo, Brazil—is a synonym of *Strebla wiedemanni*. Although these authors described and figured the antennal arista as "bipectinate," i.e., pectinate on both sides, this condition is unusual in *wiedemanni*. Typically, the arista is "unipectinate" as shown in their Fig. 25.

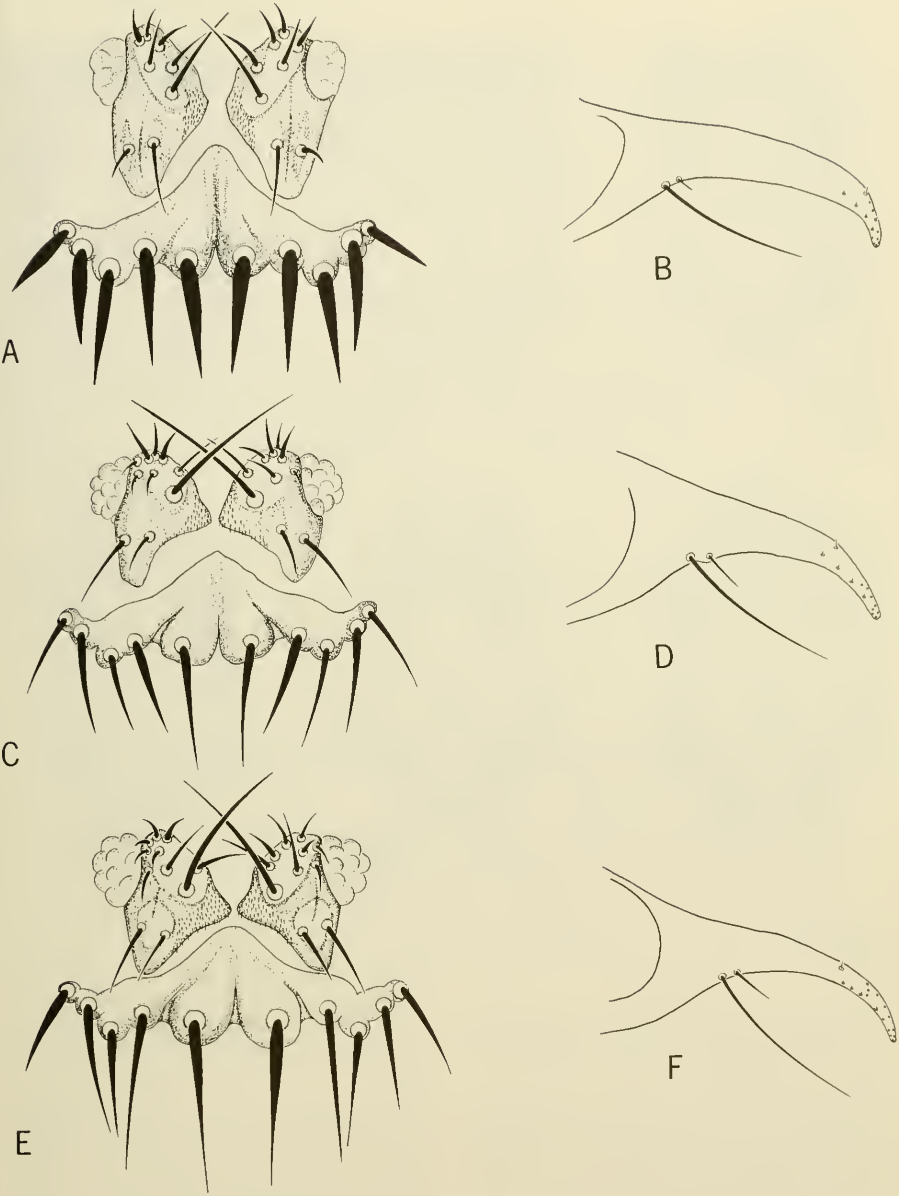

Fig. 65. Laterovertices, postvertex and occipital plates (A, C, E), postgonites (B, D, F) of: A-B, *Anastrebla nycteridis* Wenzel; C-D, *Anastrebla modestini* Wenzel; E-F, *Anastrebla mattadeni* Wenzel. From Wenzel et al. (1966).

The specimen which they recorded and figured as *E. mirabilis*—ex *Desmodus r. rotundus*, Cruz del Eje, Cordoba, Argentina—appears to be *wiedemanni*, too. The shape of the detached frontoclypeal plates, the shape of the postvertex, and the number of setae shown in the prescutal arc suggest that it could be *Strebla diphyllae*. Unfortunately, the authors neither described nor figured the chaetotaxy of the hind tibiae, which would have made it possible to fix its identity. However, *Diphylla ecaudata*, the host of *S. diphyllae*, probably does not occur in Cordoba, Argentina, and this further suggests that their specimen of "*mirabilis*" was *S. wiedemanni*. All specimens of *S. diphyllae* known to me are from Central America and Colombia (Vaupes: Río Inride, Cerro de los Pinturas). It was not taken in Venezuela by the survey teams.

Venezuelan Survey Records (1,160 males, 809 females, 2 sex undet.)

This characteristic parasite of the vampire bat, *Desmodus rotundus*, occurs on that host throughout its range.

To briefly summarize, the survey teams collected this fly at 63 localities in 16 states, as follows: Apure (6 localities, 24-76 m); Barinas (3 localities, 609-1,070 m); Bolívar (2 localities, 150-306 m); Carabobo (5 localities, 25-1,537 m); Dto. Federal (1 locality, 1,507 m); Falcón (5 localities, 2-470 m); Guárico (4 localities, 100-630 m); Lara (1 locality, 580 m); Miranda (6 localities, 1-570 m); Monagas (3 localities, 18-1,180 m); Nueva Esparta (2 localities, 1-41 m); Sucre (6 localities, 1-380 m); T. F. Amazonas (9 localities, 119-155 m); Trujillo (6 localities, 90-164 m); Yaracuy (1 locality, 25 m); and Zulia (3 localities, 73-270 m).

Additional Venezuelan Material Examined

MONAGAS: 2 males ex *Desmodus r. rotundus*, Caripe Distr., Caripe, 24-IX-62, J. Ojasti.

Host Associations

Of 1971 specimens of *Strebla wiedemanni* collected by the survey teams, 1937 (98.3 percent) were from 442 *Desmodus rotundus*. The remaining 34 specimens were from 16 bats of 11 species.

Genus *Paraeuctenodes* Pessôa and Guimarães

Paraeuctenodes Pessôa and Guimarães, 1937:257

Type Species: *Paraeuctenodes longipes* Pessôa and Guimarães, 1937

Except for their markedly elongate hindlegs, which lack conspicuous macrosetae, and their distinctive male postgonites, the species of *Paraeuctenodes* differ from those of *Strebla* in only relatively minor structural details.

Key to Species of *Paraeuctenodes*

1. Male. Setae along distal margin of sternum 5 subequal, all as long as or longer than sternum. Sternum 7+8 with an oblique row of 4 short setae on each side. Postgonites strongly narrowed and distinctly curved from insertion of macrosetae to apex. Female. Tergum 7 with 2 pairs of short setae ...... *similis* n. sp.

   Male. Distal margin of sternum 5 with ± 11 setae: 1 pair much longer than sternum and separated by short setae of about same size as ventral connexivals; 2-4 that are as long as sternum; the rest short, no longer than discals. Sternum 7+8 with 1-2 short setae on each side. Postgonites little narrowed in profile, except for the very slender, downwardly curved apices. Female. Tergum 7 with 1 pair short setae ...... *longipes* Pessôa and Guimarães

Paraeuctenodes longipes Pessôa and Guimarães (Fig. 66E)

Paraeuctenodes longipes Pessôa and Guimarães, 1937:258, Fig. 1-4.—Wenzel, Tipton, and Kiewlicz, 1966:627

I have examined both the holotype female and allotype male of this species. The holotype compares well with a female from *Glossophaga soricina* (SVP 9063) from Bolívar (El Manaco).

Venezuelan Survey Records (18 males, 17 females)

BOLÍVAR: 2 males and 2 females ex *Glossophaga soricina*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 9-23-VI-66; 1 male and 2 females, same host, 20 km W La Paragua, Hato San José, 300 m, 4-7-IV-67; 1 male, same host, 50 km SE El Manteco, Río Supamo, 150 m, 8-IV-66.

CARABOBO: 1 female ex *Glossophaga soricina*, 6 km ENE Urama, Urama, 25 m, 6-III-66.

DTO. FEDERAL: 1 male ex *Glossophaga soricina*, nr. El Limón, 48 km W Caracas, Hda. Carapiche, 398 m, 20-VIII-66.

FALCÓN: 1 female ex *Glossophaga soricina*, 16 km ENE Mirimire, nr. La Pastora, 70 m, 1-XII-67.

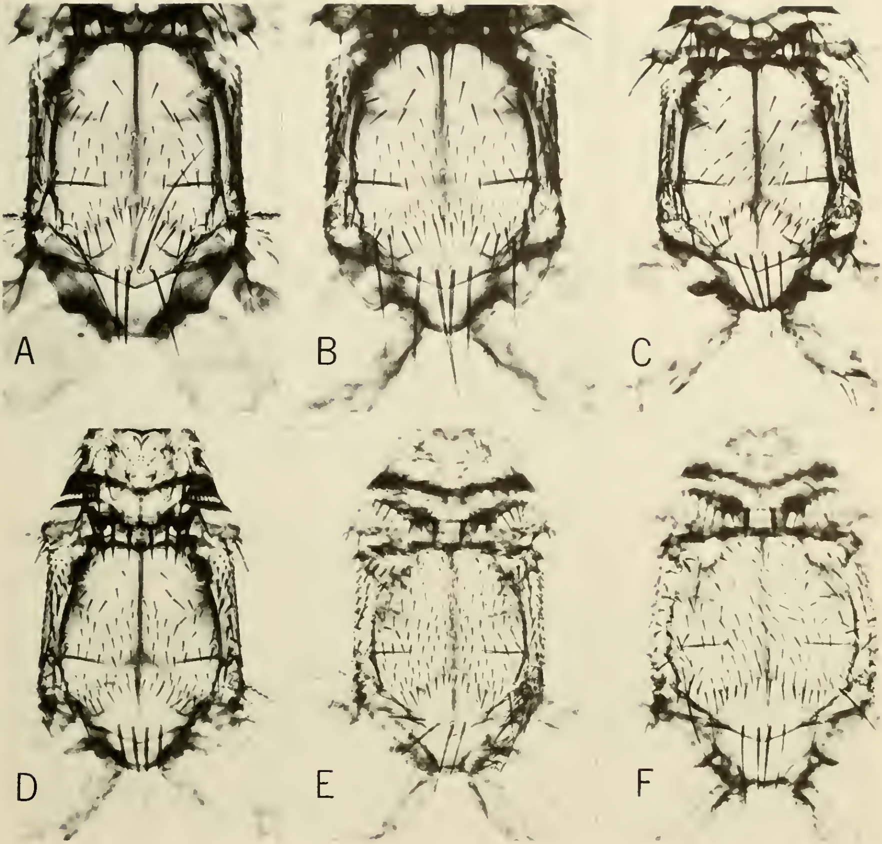

Fig. 66. Thorax, dorsal view: A, *Anastrebla modestini* Wenzel; B, *Anastrebla mattadeni* Wenzel; C, *Anastrebla caudiferae*, new species (female allotype); D, *Anastrebla spurrelli*, new species, female (SVP 43065); E, *Paraeuctenodes longipes* Pessôa and Guimarães; F, *Paraeuctenodes similis*, new species (male holotype). A-B, from Wenzel et al. (1966).

LARA: 1 male ex *Glossophaga longirostris*, 10 km N El Tocuyo, Caserio Boro, El Tocuyo, 528 m, 14-VII-68.

SUCRE: 2 males and 1 female ex *Glossophaga soricina*, 9 km NE Güiria, Ensenada Cauranta, 1-7 m, 4-16-VI-67; 1 male ex *Glossophaga longirostris*, 16 km E Cumaná, ? m, 22-XII-66.

T. F. AMAZONAS: 1 female ex 1 *Tadarida gracilis*, 1 male ex *Glossophaga soricina*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 2-13-I-67; 6 males and 4 females, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 13-20-VII-67; 1 female, same host, Río Orinoco, Tamatama, 135 m, 4-V-67.

YARACUY: 1 male ex *Glossophaga soricina*, 20 km NW San Felipe, Minas de Aroa, 400 m, 12-XII-67.

ZULIA: 1 male and 4 females ex *Glossophaga soricina*, 21 km SW Machiques, Kasmera, 270 m, 19-IV-68.

OTHER VENEZUELAN MATERIAL EXAMINED

BOLÍVAR: 1 female ex *Artibeus lituratus*, 38 km S El Dorado, 2-VIII-62, J. Ojasti.

Host Associations

Of 35 specimens of *Paraeuctenodes longipes* that were collected by the survey team, 33 (94 percent) were from 22 *Glossophaga soricina* and 1 from *G. longirostris*. The single record from *Tadarida gracilis* is dubious. The holotype female and allotype male were reported to be from *Lonchoglossa ecaudata* and *Phyllostomus hastatus*, respectively. These records are also suspect.

Paraeuctenodes similis, new species

(Fig. 66F)

Paraeuctenodes similis is a larger and more darkly pigmented species than *P. longipes* Pessôa and Guimarães. The males are easily separated from those of *longipes* by: the oblique dorsolateral row of 4 short setae on each side of sternum 7+8; the ± 11 long marginal setae of sternum 5, all of which are as long as or longer than the sternum (only 2-4 as long as sternum in *longipes*); and by the different male postgonites. The female is distinctive in having a larger tergum 7 with 2 pairs of short discal setae rather than 1.

Description

Generally with the characters of *longipes* but larger and more deeply pigmented. *Head.* Setae of posterovertex and occiput generally a little longer and stronger than in *longipes.* Eyes with 7 facets. *Thorax.* Prescutum similar to that of *longipes* in chaetotaxy and structure, but with the anterior pigmented suture usually much more distinct. Scutum with longer, more uniform antescutellar setae than *longipes. Abdomen.* Sternum 2 with ± 30 discal setae, and ± 11-12 marginals, all but 1 pair of widely separated macrosetae slightly longer than the discals, the macrosetae about twice as long as the other marginals. Dorsolateral and lateral connexival setae subequal, much shorter than the medioventrals, which are about twice as long as discals of sternum 2 but not as strong. Female. Tergum 7 subrotund, longer than broad, with 2 pairs of short distal setae, the anterior pair longer and more widely separated. Supra-anal plate with 4 distal macrosetae. Seventh sternites small, nearly round, with 4-5 setae including 3 macrosetae, 2 of these longer than the other. Male. Sternum 5 well defined, with 11 marginal setae, all of them as long as or longer than the sternum; discs occur laterally, with setae arranged in 3 transverse rows. Sternum 7+8 on each side with an oblique row of 4 short dorsolateral setae. Tergum 9 with 5 distal macrosetae, the dorsolateral one distant from the others, 2 shorter setae ventrally, and 2 short setae anterior to them. Postgonites with macrosetae inserted near base, strongly narrowed and curved from insertion of macrosetae to apex.

Measurements

	Males	Females
BL	2.40-2.68	2.57
TL	0.86-0.99	1.05
WL	1.90-2.02	2.42
WW	0.88-0.98	1.11

Type Data: Male holotype ex *Carollia perspicillata* (SVP 43206), Venezuela, Bolívar, 13 km NE Icabarú, Icabarú, 881 m, 8-V-68. Paratypes—VENEZUELA. Bolívar: 1 male ex *Carollia perspicillata*, 85 km SSE El Dorado, Km 125, 916 m, 13-V-66. COLOMBIA. Santander: 1 female ex *Carollia perspicillata* (CJM 5889), San Joaquin, 24-IX-66. BRAZIL. Sao Paulo: 1 male ex *Trachops cirrhosus* (FMNH 94726), Primeiro Morro, 4-VII-61, A. M. Olalla.

Genus *Anastrebla* Wenzel

Anastrebla Wenzel, 1966:627

Type Species: *Anastrebla modestini* Wenzel, 1966:629

Strebla, authors, not Wiedemann

This genus is distinctive not only in the characters given in the key to genera (see above) but in others which were not noted in my (Wenzel, 1966:628) diagnosis of the genus. Chief among these is the structure of the anterior angles of the thorax.

In *Strebla*, as in many of the Streblidae, the notopleural sutures are membranous for most of their length, then bend outwardly on each side as closed sutures and extend to the spiracles behind anterior margin. Thus, the upper portion of each mesepisternum extends nearly to the anterior angles, its anterior portion lateral to the anterior angles of the prescutum. There are only moderate emarginations on the anterior face of thorax to accommodate the dorsal lobes of the procoxae. In *Anastrebla*, however, the closed portion of the notopleural sutures continue anteriorly without bending laterally, and each bends downward along the floor of a pronounced fossa formed by an excavation of the prescutum, the inner anterior portion of the mesepisternum, and the proepisternum. Thus, the anterior angles of the thorax are preempted by the rather broad anterodorsal portions of the mesepisterna, which are twice as wide anteriorly as posteriorly and studded with short, thornlike setae which become larger posteriorly. The epaulet setae are inserted on each side in a longitudinal rather than horizontal row on a short raised longitudinal protuberance, which is bounded by the "coxal fossa" on one side and by another shorter, less prominent groove on its medial margin. The anterior margin of the thorax is incised by these two grooves—which appear to accommodate part of the occipital lobes and several of their setae—and thus the medial portion of the anterior margin is set off as a short, broad projection. In *Anastrebla nycteridis* Wenzel, *A. caudiferae* n. sp. and *A. spurrelli* n. sp., the lateral angles of this projection almost invariably bear 2 short stout setae and in *mattadeni* and *modestini* only 1. Sternum 5 is "absent" in males of *Anastrebla*, though in *A. nycteridis* they appear to be represented by 2 transverse, feebly sclerotized strips which are hardly longer than the width of a setal socket.

Key to the Species of *Anastrebla*

1. Eyes raspberrylike, noticeably bulging beyond lateral margins of laterovertices; facets distinct. Posterior lobes of laterovertices shorter, postvertex not as strongly produced anteriorly. Median projection of anterior margin of prescutum with a single short, coarse seta in each lateral angle (if, rarely, 2 are present, the second one is inserted behind the other and usually is much weaker) 2

Eyes wider anteriorly than posteriorly, scarcely projecting beyond—their outer margins nearly straight and parallel with—the lateral margins of the laterovertices; facets may be partially fused. Posterior lobes of laterovertices longer, the anterior median projection of the postvertex strongly produced between them. Median projection of anterior margin prescutum with 2 short, stout setae, side by side, in each lateral angle 4

2. First longitudinal vein bare dorsally, or with only a few setae distally 3

First longitudinal vein essentially setose throughout its length, bare for only a very short distance basally. Other veins setose throughout, excepting a short area at base of *rs* and sixth longitudinal vein .... *mattadeni* Wenzel

3. Longitudinal veins generally setose throughout, excepting: vein 1, with distal setae only; *rs*, setae lacking basally; vein 6, variable, sometimes setose throughout excepting a short basal area, or with distal setae only. Tergum 7 longer, a pair of short setae inserted posterior to the macrosetae .... *modestini* Wenzel

Wing veins very irregularly setose: vein 1 with 1-6 setae distally; *rs* with several distal setae; vein 2 usually bare on ⅓ to basal ½, sometimes with scattered setae throughout length; vein 3 bare on basal ½ to ⅔; vein 4 with 1-3 setae before crossvein 1, and 2-3 more setae before and 1-2 beyond crossvein 2; vein 5 with ± 6 setae basally, then bare to near crossvein 2, sometimes with scattered setae between crossveins 2 and 3; vein 6 completely bare. FEMALE. Tergum 7 shorter oval-transverse, with a pair of short setae inserted between the pair of macrosetae .... *caudiferae* n. sp.

4. First longitudinal wing vein lacking setae on about distal half of length. MALE. Postgonites strongly, evenly curved (Fig. 60I). FEMALE. Tergum 7 with a pair of macrosetae, but lacking a pair of small setae .... *spurrelli* n. sp.

First longitudinal vein setose throughout its length. MALE. Postgonites less curved, except at apex (Fig. 65B). FEMALE. Tergum 7 with a pair of macrosetae and a pair of short setae slightly posterior and medial to them .... *nycteridis* Wenzel

Anastrebla modestini Wenzel

(Fig. 65C-D, 66A)

Anastrebla modestini Wenzel, 1966:629, Fig. 138A, 139C-D

VENEZUELAN SURVEY RECORDS (43 males, 26 females, 1 sex undet.)

BARINAS: 1 male ex *Anoura geoffroyi*, 2 km SW Altamira, Altamira, 609 m, 3-I-68; 1 male, same host, Altamira, 794 m, 20-XII-67.

BOLÍVAR: 1 male and 1 female ex *Anoura* sp. A, 1 male and 2 females ex *Anoura geoffroyi*, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 13-23-VI-66; 6 males, 6 females, and 1 sex undet., same host, 2 males and 2 females ex *Anoura* sp. A, 85 km SSE El Dorado, Km 125, 1,032-1,165 m, 10-26-V-66; 1 male ex *Anoura geoffroyi*, 20 km W La Paragua, Hato San José, 300 m, 8-IV-67; 1 male, same host, 21 km NE Icabarú, El Pauji, Icabarú, 851 m, 7-V-68.

CARABOBO: 1 female ex *Anoura* sp. A, 1 male and 1 female ex *Anoura geoffroyi*, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 27-30-XI-67; 1 male and 1 female, same host, 2 km SE Montalbán, Potrerito, Montalbán, 598 m, 1-XI-67.

DTO. FEDERAL: 2 males ex *Anoura* sp. A, 5 km NNE Caracas, nr. Hotel Humboldt, Pico Ávila, 2,240 m, 31-VIII-65.

FALCÓN: 1 male ex 1 *Carollia perspicillata*, 3 males and 5 females ex *Anoura geoffroyi*, 16 km ENE Mirimire, nr. La Pastora, 70 m, 28-XI—1-XII-67; 3 males and 1 female, same host, 14 km ENE Mirimire, nr. La Pastora, 60-122 m, 21-27-XI-67.

GUÁRICO: 1 female ex *Anoura geoffroyi*, 10 km NE Altagracia, Hda. Elvira, 630 m, 16-IX-66.

MÉRIDA: 1 male and 1 female ex *Anoura geoffroyi*, 12 km SE La Azulita, La Carbonera, 2,190 m, 21-IV-66; 1 male, same host, 6 km ESE Tabay, Middle Refugio, Tabay, 2,550 m, 15-IV-66.

MIRANDA: 1 male ex *Anoura geoffroyi*, Birongo, 60 m, 22-I-68; 1 male and 1 female, same host, 5 km NNW Guarenas, Curupao, 1,160-1,180 m, 6-14-X-66.

MONAGAS: 1 female ex *Anoura geoffroyi*, 3 km NW Caripe, nr. San Agustín, 1,170 m, 1-VII-67; 3 males, same host, 5 km NW Caripe, San Agustín, 1,150-1,165 m, 27-VI—3-VII-67.

SUCRE: 2 males ex *Anoura geoffroyi*, 9 km NE Güiria, Ensenada Cauranta, 7 m, 15-16-VI-67; 1 male ex *Anoura* sp. A, 26 km ESE Carúpano, Manacal, 366 m, 19-VII-67.

T. F. AMAZONAS: 2 males ex *Anoura* sp. A, 3 males ex *Anoura geoffroyi*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 24-27-VII-67; 2 males and 1 female, same host, Cabecera del Caño Culebra, 40 km NNW Esmeralda, 1,400 m, 8-II-67; 1 female, same host, 30 km S Pto. Ayacucho, Platanilla, Pto. Ayacucho, 119 m, 13-X-67; 1 male, same host, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 8-X-67.

Remarks

Variation in chaetotaxy of the sixth longitudinal wing vein in *modestini* is both interesting and puzzling. In Panamanian specimens this vein typically has 1-3 setae proximal to—and 1 or more just beyond—midlength, and several near third crossvein. Most Venezuelan specimens from *Anoura geoffroyi* fall into two distinct classes as regards the number of setae on vein 6, those with 1-8 (more commonly 1-5) setae, and those with 12-20. Most of those with 1-5 setae were taken at elevations above 366 meters, but the same was generally true of the hosts. However, approximately 50 percent of those flies with 1-5 setae were taken together with *Exastinion deceptivum* n. sp. (see above), but only one with *E. clovisi*. Specimens from Colombia were also taken together with *E. deceptivum*, from *A. geoffroyi peruana*. Pending further analysis and identification of the host bats to subspecies, the data suggest that the host specimens represent more than one subspecies (or species?) and that altitudinal differences are involved. While the differences in chaetotaxy may simply reflect different developmental responses to environmental variables, the strong correlation that exists between the distribution of *E. deceptivum* and those of *Anastrebla modestini* that have reduced setation on vein 6 suggests a more complex situation. Those specimens of *modestini* taken from *Anoura* "sp. A" exhibit essentially the same setal differences as do those from *A. geoffroyi*. No specimens of *E. deceptivum* were taken from *Anoura* sp. A.

Anastrebla mattadeni Wenzel

(Fig. 65E-F, 66B)

Anastrebla mattadeni Wenzel, 1966:631, Fig. 138B, 139E, F

Venezuelan Survey Records (1 male ex 1 *Anoura cultrata*)

MIRANDA: 1 male, 4 km SW Birongo, Cueva Walter Dupouy, Birongo, 195 m, 28-I-68.

Remarks

This species was described from Panama and Venezuela (Rancho Grande Biological Station) chiefly from *Anoura cultrata*, which appears to be its characteristic host. Because of a mislabeled vial, I (Wenzel, loc. cit.) mistakenly recorded some of the Venezuela paratypes as being from *A. aculeata*, thereby inadvertently creating a *nomen nudum*. There is no species of *Anoura* by that name.

Anastrebla caudiferae, new species

(Fig. 60J, 66C)

Strebla vespertilionis Fabricus of Speiser, 1900: 38, Pl. 4, Fig. 1, 2

Anastrebla caudiferae is clearly the species which Speiser (loc. cit.) recorded from *Lonchoglossa ecaudata* (= *Anoura caudifera*). It is nearly identical to *A. modestini* and *A. mattadeni* in structure of the head, including eyes and shape of the postvertex, but the festoon setae of the postvertex and occipital lobes are generally slightly coarser. The female differs in that tergum 7 is transversely oval and the pair of short setae are inserted medial to rather than behind the macrosetae, the 4 arranged in a transverse row.

DESCRIPTION

Head. Eyes and shape of postvertex as in *A. modestini* and *A. mattadeni*, but festoon setae usually slightly coarser than in those species. *Thorax.* Epaulets consisting of 4 setae, 2 of them usually coarser and longer and 2 shorter and finer, sometimes 3-1; each lateral angle of median prescutal projection usually with only 1 coarse seta, occasionally 2 and even 3, but the extra ones are usually smaller and lie behind rather than next to the strong seta; prescutal arcs with 3-5 setae (mean, 4); with 18-33 (mean, 22.5) discal setae, and 4-6 setae basally along each lateral margin. Scutum with 28-47 (mean, 37) setae. *Wings.* Setation (excluding macrosetae) as follows: first longitudinal vein largely bare, with 1-6 setae near apex; *rs* with 1-3 distal setae; second vein usually bare on basal ⅓ to ½, sometimes with scattered setae over entire length; third vein bare on basal ½ or ⅔; fourth vein with 1-3 setae near first crossvein, 2-3 near second crossvein, and 1-2 beyond; fifth vein with ± 6 basally, then bare to near second crossvein, sometimes with scattered setae between second and third crossveins; sixth vein completely bare. *Abdomen.* Dorsolateral and lateral abdominal connexival setae minute, those of venter about twice as long and nearly as long as, but much weaker than, shorter discal setae of sternum 2; much longer segmentally arranged paired setae present as usual, also an apical transverse row of much longer setae in both sexes. Sternum 2 with 14-19 setae on apical margin (mean, 16.5), and 22-31 (mean, 25) on disc. FEMALE. Tergum 7 oval-transverse, with 2 short setae placed medial to and on a line with the 2 macrosetae. Supra-anal plate with 4 long, slender distal setae and a pair of short discal setae anterior to these. Seventh sternites with 8-11 setae of varying lengths including ± 4 distinctly longer macrosetae. MALE. Sternum 6 well developed. Sternum 7+8 with 3-5 setae, 3 of them conspicuous macrosetae. Tergum 9 with 7-11 setae in 2 rows, usually an anterior row of about 3 very long macrosetae and 1 or 2 shorter, more ventral setae and a laterodistal row of more slender setae of varying lengths, none as long as the longer macrosetae of anterior row. Postgonites as in Fig. 60J.

MEASUREMENTS

	Males	Females
BL	1.92-2.14	2.15-2.36
TL	0.68-0.78	0.67-0.78
WL	1.90-2.11	1.88-2.16
WW	0.71-0.80	0.72-0.82

TYPE DATA: Male holotype and female allotype ex *Anoura caudifer* (SVP 10512), Venezuela, Miranda, 5 km NNW Guarenas, Curupao, 1,140 m, 13-X-66. PARATYPES—BARINAS: 1 female ex Anoura caudifer, Altamira, 620 m, 26-XII-67; 3 males, 3 females, 1 sex undet., same host, 2 km SW Altamira, Altamira, 611-620 m, 28-XII-67—1-1-68. BOLÍVAR: 4 males and 3 females ex *Anoura caudifer*, 85 km SSE El Dorado, Km 125, 826-1,165 m, 16-23-V-66. CARABOBO: 3 males ex *Anoura caudifer*, 4 km NW Montalbán, La Copa, Montalbán, 1,537 m, 29-30-XI-67. DTO. FEDERAL: 2 males ex *Anoura caudifer*, 4 km NNW Caracas, Los Venados, 1,498 m, 23-VII-65. MIRANDA: 8 males and 6 females, same data as the holotype but 1,180 m, 13-14-X-66; 1 female, same host, 16 km SSE Caracas, San Andres, 950 m, 30-XII-65. T. F. AMAZONAS: 1 male ex *Anoura caudifer*, Caño Culebra, 50 km NNW Esmeralda, Cerro Duida, 700 m, 17-I-67.

Anastrebla nycteridis Wenzel
(Fig. 65A, B)

Anastrebla nycteridis Wenzel, 1966:629, Fig. 139A-B

Until now, *Anastrebla nycteridis* Wenzel was known only from the holotype male. Except for a marked difference in size, the slightly shorter ventral abdominal connexival setae, and the presence of a pair of short setae in addition to the macrosetae on tergum 7, the female of *nycteridis* is remarkably similar to that of *A. spurrelli* n. sp. Both sexes of *nycteridis* are more darkly pigmented, have more numerous prescutal discal setae behind the arc, ranging in number from 43-63 (mean, 62) and a slightly larger number (43-44) of scutal setae, and have the first longitudinal vein setose for its entire length.

MEASUREMENTS

	Males	Females
BL	2.24	2.56-2.81
TL	0.76-0.83	0.87-0.96
WL	2.06-2.21	2.20-2.32
WW	0.76-0.84	0.87-0.98

VENEZUELAN SURVEY RECORDS (8 males and 9 females ex 11 *Lonchophylla robusta*)

BARINAS: 4 males and 1 female, 2 km SW Altamira, Altamira, 609-620 m, 26-XII-67—4-I-68; 1 male and 1 female, 7 km NNE Altamira, Altamira, 1,070 m, 25-XII-67; 2 males and 3 females, Altamira, 794 m, 21-XII-67—10-I-68.

ZULIA: 1 female, 21 km SW Machiques, Kasmera, 270 m, 19-IV-68; 1 male and 3 females, 19 km WSW Machiques, Novito, 1,135 m, 2-V-68.

Host Associations

All known specimens of *Anastrebla nycteridis* are from *Lonchophylla robusta*.

Anastrebla spurrelli, new species

(Fig. 60I, 66D)

Anastrebla spurrelli closely resembles *A. nycteridis* but differs in its distinctly smaller size, more distinct eye facets (none partially fused), the absence of a pair of short setae in addition to macrosetae on female tergum 7, and the strongly, evenly curved male postgonites. Except for these, most characteristics of *A. nycteridis* apply to *spurrelli* as well, and the following description chiefly emphasizes differences or character states not mentioned in the original description of *nycteridis*.

Description

Head. Essentially identical to that of *nycteridis*, but all eye facets distinct. Anterior projection of postvertex generally slightly broader. *Thorax.* With 4 epaulet setae, 3 of them coarser and 1 shorter and finer. Prescutum 5-6 setae on each side in prescutal arc, and posterior to these 34-50 (mean, 44) discal setae and 5-6 setae along each basolateral margin. Scutum with 22-39 shorter setae (mean, 26) and 19-24 intermediate or long antescutellar setae (mean, 22). *Wings.* First longitudinal vein bare on about distal half, the others essentially setose throughout. *Abdomen.* Dorsolateral and lateral connexival setae minute, the ventral setae about twice as long, slightly longer than in *nycteridis*. Sternum 2 with 13-16 (mean, 14.6) marginal and 21-30 (mean, 25) discal setae. Female. Tergum 7 with anterior portion suborbicular, a macroseta inserted on each side at widest portion; united to supra-anal plate by a narrower posterior strap. Supra-anal plate with the usual 4 distal macrosetae and a pair of short discal setae anterior to these. Seventh sternites with 10-12 setae of varying lengths, none very short, several distinctly longer macrosetae. Male. Sternum 5 not visible, but a row of 8-9 long setae apparently represent the setae of the apical margin of that sternum. Sternum 6 well developed. Sternum 7+8 with 3-6 (usually 4) setae on each side, including 3 very long macrosetae. Tergum 9 with 9-12 setae arranged in 2 rows, an anterior row usually of 5-6, the 4 more dorsal ones very long macrosetae, the ventral ones much shorter—and a distal row, of which several are macrosetae, but shorter than those of anterior row. Postgonites strongly, evenly curved, their distal half nearly at right angles to the long axis.

Measurements

	Males	Females
BL	1.89-2.12	1.87-2.52
TL	0.66-0.70	0.70-0.78
WL	1.56-1.77	1.79-1.94
WW	0.60-0.77	0.75-0.83

Type Data: Male holotype and female allotype ex *Lionycteris spurrelli* (SVP 9270), Venezuela, Bolívar, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 8-25-VI-66. Paratypes—Bolívar: 1 male ex 1 *Ametrida centurio*, 4 males and 1 female ex *Lionycteris spurrelli*, 85 km SSE El Dorado, Km 125, 1,014-1,032 m, 10-19-V-66; 12 males and 3 females, same data as the holotype; 2 females ex *Lionycteris spurrelli*, 11 km NE Icabarú, Icabarú, 750 m, 9-V-68; 1 male and 1 female, same host, 13 km NE Icabarú, Icabarú, 817 m, 8-V-68; 1 male, same host, 19 km NE Icabarú, Icabarú, 700 m, 6-V-68; 9 males and 7 females, same host, 21 km NE Icabarú, El Pauji, Icabarú, 851 m, 6-V-66—8-V-68. T. F. Amazonas: 1 male ex *Lionycteris spurrelli*, 56 km NNW Esmeralda, Río Cunucunuma, Belén, 150 m, 1-I-67; 1 male, same host, Cabecera del Caño Culebra, 40 km NNW Esmeralda, 1,400 m, 6-II-67; 1 male, same host, 32 km S Pto. Ayacucho, Raya, Pto. Ayacucho, 135 m, 12-IX-67; 1 male, same host, 65 km SSW Pto. Ayacucho, nr. Morganito, Pto. Ayacucho, 161 m, 4-X-67; 4 males, same host, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 25-VII-67.

Host Associations

Of 52 specimens of *Anastrebla spurrelli* collected by the survey teams, all but one were from *Lionycteris spurrelli*. The single specimen from *Ametrida centurio* is probably a contaminant or a transitory transfer.

Genus *Metelasmus* Coquillett

Metelasmus Coquillett, 1907:292

Type Species: *Metelasmus pseudopterus* Coquillett, 1907:292

Lemosia Pessôa and Galvão, 1936:243
Type Species: *Lemosia setosa* Pessôa and Galvão, 1936:244

Metelasmus sp.

An interesting new species of *Metelasmus* was collected from *Sturnira ludovici* by the survey teams. Among other characters, it is distinctive in having very small detached frontoclypeal plates, long slender festoon setae on the posterior margin of postvertex and occipital plates, reduced mesonotal chaetotaxy, longer wings, and longer abdominal connexival setae. However, I hesitate to describe the species from these specimens because the apical half of the abdomen is missing in one and badly damaged in the other. Nonetheless, I call attention to the fact that *Metelasmus* is not a monotypic genus.

Venezuelan Survey Records (1 male and 1 sex undet.)

BARINAS: 1 male ex *Sturnira ludovici*, 2 km SW Altamira, Altamira, 611 m, 1-1-68; 1 sex undet., same host, 794 m, 21-XII-67.

Metelasmus pseudopterus Coquillett
(Fig. 2A-B, 67)

Metelasmus pseudopterus Coquillett, 1907:292, Fig.—Wenzel, Tipton, and Kiewliez, 1966:634, Fig. 140

Lemosia setosa Pessôa and Galvão, 1936:244, Fig. 1-4

Venezuelan Survey Records (139 males, 88 females, 1 sex undet.)

To briefly summarize, the survey team collected 128 males, 85 females, and 1 sex undet. from 138 *Artibeus jamaicensis*. These specimens were collected at 44 localities in 15 states, as follows: Apure (1 locality, 24 m); Barinas (2 localities, 609-794 m); Bolívar (3 localities, 150-775 m): Carabobo (4 localities, 598-1,537 m); Dto. Federal (2 localities, 398-1,465 m); Falcón (6 localities, 2-480 m); Guárico (2 localities, 470-630 m); Lara (1 locality, 528 m); Miranda (4 localities, 60-1,160 m); Monagas (1 locality, 1,160-1,165 m); Sucre (3 localities, 1-90 m); T. F. Amazonas (3 localities, 138-155 m); Trujillo (4 localities, 90-164 m); Yaracuy (1 locality, 395 m); Zulia (7 localities, 24-1,135 m). Specimens collected from other hosts are as follows:

APURE: 1 male and 1 female ex *Artibeus lituratus*, 29 km SSW Santo Domingo, Selvas de San Camilo, Nulita, 24 m, 25-I–5-II-68.

BOLÍVAR: 1 male and 1 female ex 1 *Artibeus* sp. A, 59 km SE El Dorado, Km 74, El Manaco, 150 m, 20-VI-66.

MONAGAS: 1 male ex 1 *Myotis nigricans*, 3 km NW Caripe, nr. San Agustín, 1,190 m, 3-VII-67.

SUCRE: 1 male ex *Artibeus lituratus*, 11 km NE Güiria, Ensenada Cauranta, 75 m, 10-VI-67.

T. F. AMAZONAS: 1 male ex 1 *Peropteryx macrotis*, Río Orinoco, Esmeralda, 135 m, 11-V-67; 3 males and 1 female ex 4 *Phyllostomus hastatus*, 1 male ex 1 *Uroderma magnirostrum*, 163 km ESE Pto. Ayacucho, Río Manapiare, San Juan, 155 m, 13-27-VII-67.

YARACUY: 1 male ex 1 *Chiroderma villosum*, 20 km NW San Felipe, Minas de Aroa, 395 m, 22-XII-67.

ZULIA: 1 male ex 1 *Phyllostomus discolor*, 33 km NW La Paz, nr. Cerro Azul, 75 m, 13-VI-68.

Other Venezuelan Material Examined

MIRANDA: 1 male ex *Artibeus jamaicensis*, El Cafetal, 8-IV-62, J. Ojasti.

Host Associations

Of 277 specimens of *Metelasmus pseudopterus* collected by the survey teams, 214 (97 percent) were from *Artibeus jamaicensis*. Although the above records, and others, clearly show that this fly is a characteristic parasite of that host, they also suggest that *M. pseudopterus* may occasionally be a facultative parasite of other fruit bats. The records from other hosts probably represent contaminants or temporary associations.

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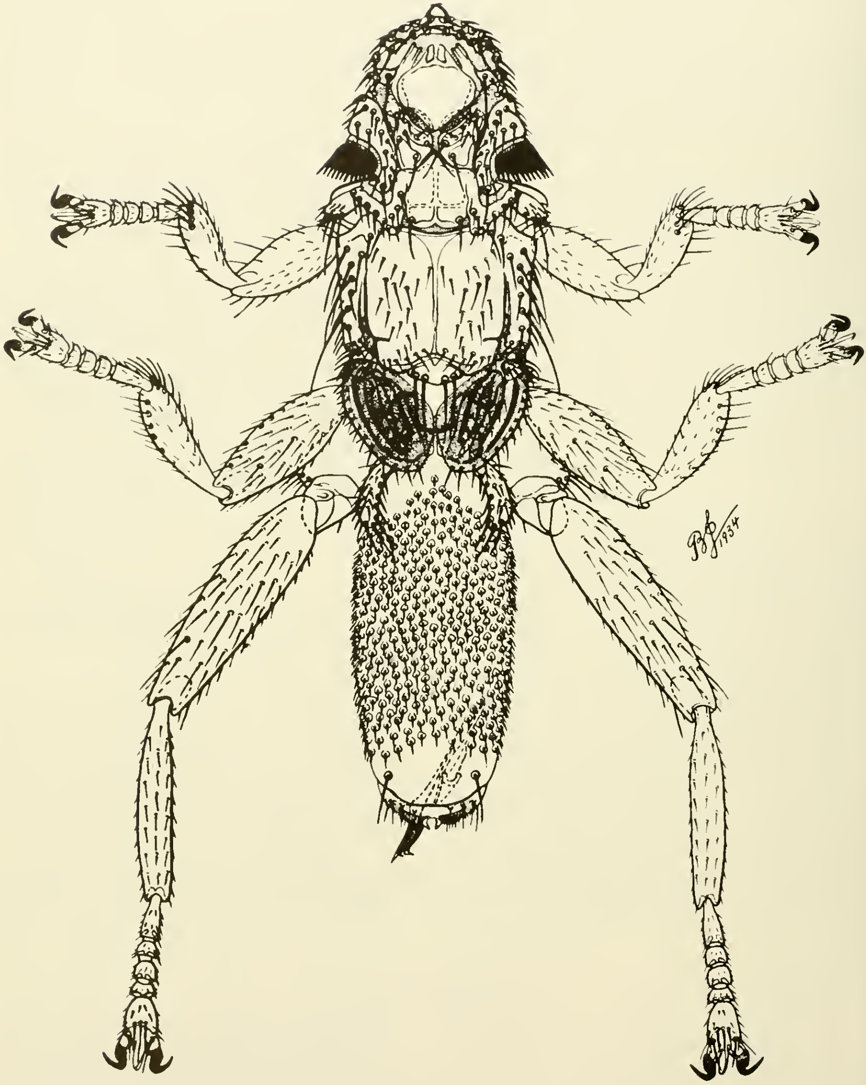

Fig. 67. *Metelasmus pseudopterus* Coquillett, male: dorsal view. From Jobling (1936).

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Above all, I am indebted to my secretary, Patricia Peyton Johnson, who expertly prepared the initial data cards, entered, organized, and kept up-to-date all of the identifications and necessary cross files, checked and collated the great mass of data for the manuscript, typed most of it, and read proofs. Without her help this work could not have been completed.

HOST-PARASITE LIST

Higher taxa as well as species arranged alphabetically
° = not a characteristic parasite of this host (contaminants and/or temporary or occasional parasites)

Order CHIROPTERA

Superfamily Emballonuroidea

Family *Emballonuridae*

- *Cormura brevirostris*
  - *Strebla cormurae,* n. sp.
- *Peropteryx kappleri*
  - *Strebla proxima,* n. sp.
  - *Trichobius longipilis,* n. sp.
- *Peropteryx macrotis*
  - °*Exastinion clovisi* (Pessôa & Guimarães)
  - °*Metelasmus pseudopterus* (Coquillett)
  - *Strebla proxima,* n. sp.
  - *Trichobius longipilis,* n. sp.
- *Peropteryx trinitatis*
  - *Strebla proxima,* n. sp.
- *Saccopteryx bilineata*
  - °*Noctiliostrebla aitkeni* Wenzel
  - *Strebla asternalis,* n. sp.
  - °*Trichobius parasiticus* Gervais
- *Saccopteryx* sp.
  - *Strebla asternalis,* n. sp.
- *Rhynchonycteris naso*
  - °*Strebla hirsutus,* n. sp.
  - °*Trichobius caecus* Edwards
  - °*Trichobius longipes* (Rudow)

Family *Noctilionidae*

- *Noctilio labialis*
  - *Noctiliostrebla maai* Wenzel
  - °*Noctiliostrebla traubi* Wenzel
  - *Paradyschiria curvata,* n. sp.
  - °*Paradyschiria lineata* Kessel
  - *Paradyschiria parvula* Falcoz
  - *Paradyschiria parvuloides* Wenzel
  - °*Strebla curvata,* n. sp.
  - °*Trichobius johnsonae* Wenzel
  - °*Trichobius parasiticus* Gervais
  - *Xenotrichobius noctilionis,* n. g., n. sp.
- *Noctilio leporinus*
  - °*Megistopoda aranea* (Coquillett)
  - °*Megistopoda* sp.
  - *Noctiliostrebla aitkeni* Wenzel
  - *Noctiliostrebla dubia* (Rudow)
  - °*Noctiliostrebla maai* Wenzel
  - *Noctiliostrebla traubi* Wenzel
  - *Paradyschiria lineata* Kessel
  - °*Trichobius joblingi* Wenzel
  - °*Trichobius parasiticus* Gervais
  - *Xenotrichobius noctilionis,* n. g., n. sp.

Superfamily Phyllostomoidea

Family *Mormoopidae*

- *Mormoops megalophylla*
  - *Nycterophilia coxata* Ferris
  - *Nycterophilia fairchildi* Wenzel
  - *Nycterophilia mormoopsis,* n. sp.
  - °*Trichobius caecus* Edwards
  - *Trichobius leionotus,* n. sp.
  - °*Trichobius parasiticus* Gervais
- *Pteronotus davyi*
  - *Nycterophilia coxata* Ferris
  - *Nycterophilia fairchildi* Wenzel
  - °*Nycterophilia mormoopsis,* n. sp.
  - °*Nycterophilia parnelli* Wenzel
  - °*Trichobius caecus* Edwards
  - *Trichobius galei* Wenzel
  - °*Trichobius johnsonae* Wenzel
- *Pteronotus parnellii*
  - °*Aspidoptera buscki* Coquillett

  - *Nycterophilia coxata* Ferris
  - °*Nycterophilia fairchildi* Wenzel
  - °*Nycterophilia natali* Wenzel
  - *Nycterophilia parnelli* Wenzel
  - °*Paradyschiria lineata* Kessel
  - *Trichobius caecus* Edwards
  - °*Trichobius joblingi* Wenzel
  - *Trichobius parasparsus,* n. sp.
  - *Trichobius sparsus* Kessel
  - °*Trichobius sphaeronotus* Jobling
- *Pteronotus personatus*
  - *Trichobius johnsonae* Wenzel
- *Pteronotus suapurensis*
  - °*Nycterophilia coxata* Ferris
  - *Nycterophilia fairchildi* Wenzel
  - *Trichobius bilobus,* n. sp.
  - *Trichobius johnsonae* Wenzel

Family *Phyllostomidae*

Subfamily *Carolliinae*

- *Carollia brevicauda*
  - *Speiseria peytoni,* n. sp.
  - °*Strebla alvarezi* Wenzel
  - *Strebla curvata,* n. sp.
  - *Strebla guajiro* (Garcia & Casal)
  - °*Trichobius dugesii* Townsend
  - *Trichobius joblingi* Wenzel
  - °*Trichobius parasiticus* Gervais
  - *Trichobius persimilis,* n. sp.
- *Carollia castanea*
  - *Trichobius joblingi* Wenzel
  - *Trichobius persimilis,* n. sp.
- *Carollia perspicillata*
  - °*Anastrebla modestini* Wenzel
  - °*Aspidoptera falcata,* n. sp.
  - °*Mastoptera* sp., *minuta* complex
  - °*Megistopoda aranea* (Coquillett)
  - °*Megistopoda* sp., *proxima* complex
  - *Paracuctenodes similis,* n. sp.
  - °*Paratrichobius* (?) *longicrus* Ribeiro
  - *Speiseria ambigua* Kessel
  - °*Strebla christinae* Wenzel
  - °*Strebla curvata,* n. sp.
  - *Strebla guajiro* (Garcia & Casal)
  - °*Strebla hertigi* Wenzel
  - °*Strebla matsoni,* n. sp.
  - °*Strebla mirabilis* (Waterhouse)
  - °*Strebla wiedemanni* Kolenati
  - °*Trichobioides perspicillatus* (Pessôa & Galvão)
  - °*Trichobius caecus* Edwards
  - *Trichobius costalimai* Guimarães
  - *Trichobius joblingi* Wenzel
  - °*Trichobius keenani* Wenzel
  - °*Trichobius lionycteridis* Wenzel
  - °*Trichobius parasiticus* Gervais
  - °*Trichobius parasparsus,* n. sp.
  - °*Trichobius tiptoni,* n. sp.
  - °*Trichobius uniformis* Curran
- *Carollia* sp.
  - *Speiseria ambigua* Kessel
  - *Strebla guajiro* (Garcia & Casal)
  - °*Trichobioides perspicillatus* (Pessôa & Galvão)
  - °*Trichobius costalimai* Guimarães
  - *Trichobius dugesioides* Wenzel
  - *Trichobius joblingi* Wenzel
- *Rhinophylla pumilio*
  - *Neotrichobius* sp., *delicatus* complex
  - °*Trichobius joblingi* Wenzel

Subfamily *Desmodontinae*

- *Desmodus rotundus*
  - °*Mastoptera* sp., *minuta* complex
  - °*Megistopoda aranea* Coquillett
  - °*Paradyschiria curvata,* n. sp.
  - °*Paratrichobius dunni* (Curran)
  - °*Paratrichobius* sp., *longicrus* complex
  - °*Strebla consocius* Wenzel
  - °*Strebla guajiro* (Garcia & Casal)
  - *Strebla wiedemanni* Kolenati
  - °*Trichobius caecus* Edwards
  - °*Trichobius costalimai* Guimarães
  - °*Trichobius dugesioides* Wenzel
  - °*Trichobius joblingi* Wenzel
  - °*Trichobius longipes* (Rudow)
  - *Trichobius parasiticus* Gervais
  - °*Trichobius tiptoni,* n. sp.
- *Desmodus youngi*
  - *Strebla diaemi* Wenzel
  - *Trichobius diaemi,* n. sp.
  - *Trichobius parasiticus* Gervais
- *Diphylla ecaudata*
  - *Trichobius diphyllae* Wenzel

Subfamily *Glossophaginae*

- *Anoura caudifer*
  - *Anastrebla caudiferae,* n. sp.
  - °*Aspidoptera buscki* Coquillett
  - *Exastinion clovisi* (Pessôa & Guimarães)
  - *Trichobius tiptoni,* n. sp.
- *Anoura cultrata*
  - *Anastrebla mattadeni* Wenzel
  - *Exastinion oculatum,* n. sp.
- *Anoura geoffroyi*
  - *Anastrebla modestini* Wenzel
  - *Exastinion clovisi* (Pessôa & Guimarães)
  - *Strebla harderi,* n. sp.
  - °*Strebla paramirabilis,* n. sp.
  - °*Trichobius caecus* Edwards
  - °*Trichobius costalimai* Guimarães
  - °*Trichobius joblingi* Wenzel
  - *Trichobius propinquus,* n. sp.
  - °*Trichobius uniformis* Curran
- *Anoura* sp. A
  - *Anastrebla modestini* Wenzel
  - *Exastinion clovisi* (Pessôa & Guimarães)
  - °*Mastoptera* sp., *minuta* complex
  - *Strebla harderi,* n. sp.
  - *Trichobius imitator,* n. sp.
  - *Trichobius propinquus,* n. sp.
- *Glossophaga longirostris*
  - °*Megistopoda aranea* (Coquillett)
  - °*Nycterophilia coxata* Ferris
  - *Paracuctenodes longipes* (Pessôa & Guimarães)
  - *Strebla curvata,* n. sp.
  - °*Strebla wiedemanni* Kolenati
  - °*Trichobioides perspicillatus* (Pessôa & Galvão)
  - *Trichobius dugesii* Townsend
  - °*Trichobius parasiticus* Gervais
  - °*Trichobius sphaeronotus* Jobling
  - °*Trichobius uniformis* Curran
- *Glossophaga soricina*
  - °*Aspidoptera buscki* Coquillett
  - *Paracuctenodes longipes* (Pessôa & Guimarães)
  - °*Paratrichobius* sp., *longicrus* complex
  - °*Strebla alvarezi* Wenzel
  - *Strebla curvata,* n. sp.
  - *Strebla guajiro* (Garcia & Casal)
  - °*Strebla wiedemanni* Kolenati

Trichobius dugesii Townsend
**Trichobius parasiticus* Gervais
Trichobius propinquus, n. sp.
Trichobius uniformis Curran

Leptonycteris curasoae
Megistopoda sp., *proxima* complex
Nycterophilia coxata Ferris
Nycterophilia fairchildi Wenzel
**Trichobius caecus* Edwards
**Trichobius galei* Wenzel
**Trichobius parasiticus* Gervais
Trichobius sphaeronotus Jobling

Lionycteris spurrelli
Anastrebla spurrelli, n. sp.
Trichobius lionycteridis Wenzel

Lonchophylla robusta
Anastrebla nycteridis Wenzel
**Anatrichobius scorzai* Wenzel
Phalcophila pulieiformis, n. g., n. sp.
Trichobius lonchophyllae Wenzel

Lonchophylla thomasi
**Strebla alvarezi* Wenzel

Subfamily *Phyllostominae*

Chrotopterus auritus
Strebla chrotopteri, n. sp.
**Strebla mirabilis* (Waterhouse)
Trichobius dugesioides Wenzel

Lonchorhina aurita
**Megistopoda aranea* (Coquillett)
**Megistopoda* sp.
**Nycterophilia parnelli* Wenzel
**Speiseria ambigua* Kessel
Strebla altmani Wenzel
Trichobius flagellatus, n. sp.
**Trichobius parasiticus* Gervais

Lonchorhina orinocensis
**Nycterophilia parnelli* Wenzel
Strebla altmani Wenzel
Trichobius ethophallus, n. sp.
Trichobius flagellatus, n. sp.
**Trichobius parasiticus* Gervais

Macrophyllum macrophyllum
**Strebla altmani* Wenzel
Strebla matsoni, n. sp.
**Trichobius caecus* Edwards
**Trichobius dugesioides* Wenzel
**Trichobius joblingi* Wenzel
Trichobius macrophylli Wenzel

Micronycteris brachyotis
Trichobius tuttlei, n. sp.

Micronycteris megalotis
**Speiseria ambigua* Kessel
Strebla alvarezi Wenzel
Trichobius keenani Wenzel
Trichobius sp.

Micronycteris microtis
Strebla alvarezi Wenzel
Trichobius keenani Wenzel

Micronycteris minuta
Strebla machadoi Wenzel
Trichobius handleyi, n. sp.
**Trichobius joblingi* Wenzel

Micronycteris nicefori
Strebla obtusa, n. sp.
**Trichobius dugesii* Wenzel
**Trichobius joblingi* Wenzel

Micronycteris schmidtorum
Strebla machadoi Wenzel

Mimon crenulatum
**Trichobius parasiticus* Gervais

Phylloderma stenops
**Megistopoda aranea* (Coquillett)
**Megistopoda* sp., *proxima* complex
**Speiseria ambigua* Kessel
Strebla christinae Wenzel

Phyllostomus discolor
**Mastoptera guimaraesi* Wenzel
**Metelasmus pseudopterus* Coquillett
**Strebla chrotopteri*, n. sp.
**Strebla consocius* Wenzel
Strebla hertigi Wenzel
**Strebla wiedemanni* Kolenati
Trichobioides perspicillatus (Pessôa & Galvão)
Trichobius costalimai Guimarães
**Trichobius dugesioides* Wenzel
**Trichobius persimilis*, n. sp.

Phyllostomus elongatus
Mastoptera sp., *minuta* complex
**Nycterophilia coxata* Ferris
Strebla consocius Wenzel
**Strebla guajiro* (Garcia & Casal)
Strebla mirabilis (Waterhouse)
**Strebla obtusa*, n. sp.
Trichobius dugesioides Wenzel
**Trichobius handleyi*, n. sp.
Trichobius joblingi Wenzel
Trichobius longipes (Rudow)
**Trichobius persimilis*, n. sp.
Trichobius sp.

Phyllostomus hastatus
**Aspidoptera buscki* Coquillett
**Aspidoptera falcata*, n. sp.
Mastoptera guimaraesi Wenzel
Mastoptera sp., *minuta* complex
**Megistopoda aranea* (Coquillett)
**Megistopoda* sp., *proxima* complex
**Metelasmus pseudopterus* Coquillett
**Paratrichobius* sp., *salvini* complex
Strebla consocius Wenzel
**Strebla guajiro* (Garcia & Casal)
Strebla hertigi Wenzel
Strebla mirabilis (Waterhouse)
**Trichobius costalimai* Guimarães
**Trichobius dugesioides* Wenzel
**Trichobius joblingi* Wenzel
Trichobius longipes (Rudow)
**Trichobius silvicolae*, n. sp.

Tonatia bidens
Mastoptera sp., *minuta* complex
Strebla galindoi Wenzel
Strebla kohlsi Wenzel

Tonatia brasiliensis
Mastoptera sp., *minuta* complex
Pseudostrebla greenwelli Wenzel
Strebla tonatiae Wenzel
Trichobius affinis, n. sp.

Tonatia carrikeri
Mastoptera sp., *minuta* complex
Pseudostrebla sparsisetis, n. sp.
Stizostrebla longirostris Jobling

Strebla tonatiae Wenzel
Trichobius sp.
Tonatia silvicola
Mastoptera minuta (Lima)
Pseudostrebla ribeiroi Lima
°*Strebla guajiro* (Garcia & Casal)
Strebla kohlsi Wenzel
°*Trichobius dugesioides* Wenzel
Trichobius silvicolae, n. sp.
Trachops cirrhosus
°*Paradyschiria curvata*, n. sp.
Speiseria magnioculus, n. sp.
°*Strebla consocius* Wenzel
Strebla mirabilis (Waterhouse)
°*Trichobius caecus* Edwards
Trichobius dugesioides Wenzel
Trichobius joblingi Wenzel

Subfamily *Stenodermatinae*
Ametrida centurio
°*Anastrebla spurrelli*, n. sp.
Artibeus cinereus
°*Aspidoptera falcata*, n. sp.
Paratrichobius lowei Wenzel
Artibeus fuliginosus
Aspidoptera buscki Coquillett
°*Mastoptera* sp., *minuta* complex
Megistopoda aranea (Coquillett)
°*Megistopoda* sp.
Neotrichobius bisetosus, n. sp.
°*Strebla guajiro* (Garcia & Casal)
°*Strebla wiedemanni* Kolenati
°*Trichobius caecus* Edwards
°*Trichobius joblingi* Wenzel
Artibeus hartii
Paratrichobius sanchezi Wenzel
Artibeus jamaicensis
Aspidoptera buscki Coquillett
°*Aspidoptera falcata*, n. sp.
°*Exastinion clovisi* (Pessôa & Guimarães)
°*Mastoptera* sp., *minuta* complex
Megistopoda aranea (Coquillett)
°*Megistopoda* sp., *proxima* complex
Metelasmus pseudopterus Coquillett
°*Neotrichobius bisetosus*, n. sp.
°*Neotrichobius* sp., *delicatus* complex
°*Nycterophilia coxata* Ferris
°*Strebla guajiro* (Garcia & Casal)
°*Strebla mirabilis* (Waterhouse)
Strebla paramirabilis, n. sp.
°*Strebla wiedemanni* Kolenati
°*Trichobioides perspicillatus* (Pessôa & Galvão)
Trichobius assimilis, n. sp.
°*Trichobius caecus* Edwards
°*Trichobius costalimai* Guimarães
°*Trichobius joblingi* Wenzel
°*Trichobius longipes* (Rudow)
°*Trichobius parasiticus* Gervais
Artibeus lituratus
Aspidoptera buscki Coquillett
°*Mastoptera* sp., *minuta* complex
°*Megistopoda aranea* (Coquillett)
°*Metelasmus pseudopterus* Coquillett
°*Strebla mirabilis* (Waterhouse)
°*Strebla wiedemanni* Kolenati
°*Trichobius caecus* Edwards
°*Trichobius joblingi* Wenzel
°*Trichobius parasiticus* Gervais
°*Trichobius uniformis* Curran
°*Trichobius urodermae* Wenzel

Artibeus sp. A
°*Metelasmus pseudopterus* (Coquillett)
Neotrichobius sp., *delicatus* complex
Artibeus sp. D
Strebla paramirabilis, n. sp.
Trichobius assimilis, n. sp.
Chiroderma salvini
Paratrichobius salvini Wenzel
°*Trichobius persimilis*, n. sp.
Chiroderma trinitatum
Paratrichobius sp., *salvini* complex
Chiroderma villosum
°*Metelasmus pseudopterus* (Coquillett)
°*Nycterophilia coxata* Ferris
Paratrichobius sp., *salvini* complex
°*Strebla chrotopteri*, n. sp.
°*Strebla wiedemanni* Kolenati
°*Trichobius dugesioides* Wenzel
°*Trichobius parasiticus* Gervais
Ectophylla macconnelli
Neotrichobius ectophyllae, n. sp.
Uroderma bilobatum
°*Aspidoptera buscki* Coquillett
°*Aspidoptera falcata*, n. sp.
°*Neotrichobius* sp., *delicatus* complex
Paratrichobius dunni (Curran)
°*Trichobius caecus* Edwards
°*Trichobius longipes* (Rudow)
°*Trichobius joblingi* Wenzel
Trichobius parasiticus Gervais
°*Trichobius parasparsus*, n. sp.
Trichobius urodermae Wenzel
Uroderma magnirostrum
°*Metelasmus pseudopterus* (Coquillett)
°*Neotrichobius* sp., *delicatus* complex
Paratrichobius dunni (Curran)
°*Strebla christinae* Wenzel
°*Strebla wiedemanni* Wenzel
°*Trichobius parasiticus* Gervais
Vampyressa bidens
Paratrichobius sp., *salvini* complex
Vampyressa pusilla
Neotrichobius delicatus (Machado-Allison)
Vampyrodes caraccioli
Paratrichobius sp., *salvini* complex
Vampyrops aurarius
Paratrichobius sp., *longicrus* complex
Strebla paramirabilis, n. sp.
Trichobius angulatus, n. sp.
°*Trichobius assimilis*, n. sp.
Vampyrops brachycephalus
Paratrichobius sp., *salvini* complex
Vampyrops helleri
°*Mastoptera* sp., *minuta* complex
°*Megistopoda* sp.
°*Neotrichobius* sp., *delicatus* complex
°*Nycterophilia fairchildi* Wenzel
Paratrichobius sp. (? *salvini* Wenzel)
°*Strebla consocius* Wenzel
°*Trichobius dugesii* Townsend
°*Trichobius lionycteridis* Wenzel
°*Trichobius tiptoni*, n. sp.
°*Trichobius uniformis* Curran

Vampyrops umbratus
°*Aspidoptera falcata*, n. sp.
°*Megistopoda* sp.
Paratrichobius sp., *longicrus* complex
°*Strebla wiedemanni* Kolenati
°*Trichobius parasiticus* Gervais

- °*Trichobius persimilis*, n. sp.
- *Trichobius vampyropis* Wenzel

Vampyrops vittatus
- *Paratrichobius* sp. (? *longicrus* Ribeiro)
- *Trichobius vampyropis*

Sphaeronycteris toxophyllum
- °*Aspidoptera falcata*, n. sp.
- °*Trichobius costalimai* Guimarães
- °*Trichobius dugesioides* Wenzel

Subfamily *Sturnirinae*

Sturnira bidens
- *Trichobius hispidus*, n. sp.

Sturnira bogotensis
- *Trichobius petersoni*, n. sp.

Sturnira erythromos
- *Megistopoda* sp., *proxima* complex
- °*Trichobius joblingi* Wenzel
- *Trichobius petersoni*, n. sp.

Sturnira lilium
- *Aspidoptera delatorrei* Wenzel
- *Aspidoptera falcata*, n. sp.
- °*Mastoptera* sp., *minuta* complex
- °*Megistopoda aranea* (Coquillett)
- *Megistopoda* sp., *proxima* complex
- °*Speiseria ambigua* Kessel
- °*Strebla galindoi* Wenzel
- °*Strebla guajiro* (Garcia & Casal)
- °*Strebla hertigi* Wenzel
- °*Strebla tonatiae* Wenzel
- °*Strebla wiedemanni* Kolenati
- °*Trichobioides perspicillatus* (Pessôa & Galvão)
- °*Trichobius costalimai* Guimarães
- °*Trichobius dugesioides* Wenzel
- °*Trichobius joblingi* Wenzel
- °*Trichobius lionycteridis* Wenzel
- °*Trichobius lonchophyllae* Wenzel
- °*Trichobius parasiticus* Gervais
- °*Trichobius parasparsus*, n. sp.

Sturnira ludovici
- *Aspidoptera falcata*, n. sp.
- °*Megistopoda aranea* (Coquillett)
- *Megistopoda* sp., *proxima* complex
- *Metelasmus* sp.
- °*Trichobius costalimai* Guimarães
- °*Trichobius persimilis*, n. sp.

Sturnira tildae
- *Aspidoptera falcata*, n. sp.
- *Megistopoda* sp., *proxima* complex
- °*Nycterophilia parnelli* Wenzel
- °*Strebla guajiro* (Garcia & Casal)
- °*Trichobius joblingi* Wenzel
- °*Trichobius parasparsus*, n. sp.

Sturnira sp.
- *Trichobius hispidus*, n. sp.

Superfamily *Vespertilionoidea*

Family *Furipteridae*

Furipterus horrens
- *Trichobius pallidus* (Curran)

Family *Molossidae*

Eumops glaucinus
- °*Nycterophilia coxata* Ferris
- °*Strebla christinae* Wenzel
- °*Trichobioides perspicillatus* (Pessôa & Galvão)

Molossus ater
- °*Noctiliostrebla maai* Wenzel
- °*Paradyschiria curvata*, n. sp.
- °*Paradyschiria parvula* Wenzel
- *Trichobius jubatus*, n. sp.
- °*Trichobius longipes* (Rudow)

Molossus aztecus
- °*Paradyschiria parvula* Wenzel
- *Trichobius jubatus*, n. sp.
- °*Trichobius lionycteridis* Wenzel

Tadarida gracilis
- °*Paracuctenodes longipes* Pessôa & Guimarães

Family *Natalidae*

Natalus tumidirostris
- °*Nycterophilia coxata* Ferris
- °*Nycterophilia fairchildi* Wenzel
- *Nycterophilia natali* Wenzel
- *Trichobius galei* Wenzel
- °*Trichobius sparsus* Kessel

Family *Vespertilionidae*

Myotis keaysi
- *Anatrichobius scorzai* Wenzel
- °*Trichobius caecus* Edwards

Myotis larensis
- °*Trichobius costalimai* Guimarães

Myotis nigricans
- °*Metelasmus pseudopterus* (Coquillett)
- °*Trichobius parasiticus* Gervais

Myotis oxyotus
- *Anatrichobius scorzai* Wenzel

Rhogeessa minutilla
- °*Trichobius sphaeronotus* Jobling

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by

Charles O. Handley, Jr.

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TABLE OF CONTENTS

ABSTRACT 1
INTRODUCTION 1
  Background 1
  Objectives 1
  Personnel 1
  Collections 2
  Data 3
  Format of Accounts of Species 3
ACKNOWLEDGMENTS 4
ACCOUNTS OF SPECIES 5
  Order Marsupialia
    Family Didelphidae
      Caluromys 5
      Monodelphis 6
      Marmosa 6
      Philander 8
      Metachirus 8
      Lutreolina 8
      Didelphis 8
      Chironectes 9
    Family Caenolestidae
      Caenolestes 9
  Order Insectivora
    Family Soricidae
      Cryptotis 9
  Order Chiroptera
    Family Emballonuridae
      Rhynchonycteris 10
      Saccopteryx 10
      Cormura 11
      Peropteryx 11
      Diclidurus 12
    Family Noctilionidae
      Noctilio 12
    Family Mormoopidae
      Pteronotus 13
      Mormoops 14
    Family Phyllostomidae
      Subfamily Phyllostominae
      Micronycteris 14
      Glyphonycteris 16
      Lonchorhina 16
      Macrophyllum 16
      Tonatia 16
      Mimon 17
      Phyllostomus 17
      Phylloderma 18
      Trachops 19
      Chrotopterus 19
      Vampyrum 19
      Subfamily Glossophaginae
      Glossophaga 19
      Lionycteris 21
      Lonchophylla 21
      Anoura 21
      Choeroniscus 22
      Leptonycteris 22
      Lichonycteris 23
      Scleronycteris 23
      Subfamily Carolliinae
      Carollia 23
      Rhinophylla 24
      Subfamily Sturnirinae
      Sturnira 25
      Subfamily Stenodermatinae
      Uroderma 26
      Vampyrops 27
      Vampyrodes 28
      Vampyressa 29
      Chiroderma 29
      Ectophylla 30
      Artibeus 30
      Ametrida 33
      Sphaeronycteris 33
      Centurio 34
      Subfamily Desmodontinae
      Desmodus 34
      Diphylla 35
    Family Natalidae
      Natalus 35
    Family Furipteridae
      Furipterus 35
    Family Thyropteridae
      Thyroptera 35
    Family Vespertilionidae
      Myotis 35
      Eptesicus 37
      Histiotus 38
      Rhogeessa 38
      Lasiurus 38
    Family Molossidae
      Molossops 39
      Neoplatymops 39
      Tadarida 39
      Eumops 39
      Molossus 40
      Promops 41
  Order Primates
    Family Cebidae
      Aotus 41
      Callicebus 41
      Cacajao 41
      Pithecia 41
      Chiropotes 42
      Alouatta 42
      Cebus 42
      Saimiri 43
      Ateles 43
  Order Edentata
    Family Myrmecophagidae
      Myrmecophaga 43
      Tamandua 43
      Cyclopes 44
    Family Bradypodidae
      Bradypus 44
      Choloepus 44
    Family Dasypodidae
      Priodontes 44
      Dasypus 44
  Order Lagomorpha
    Family Leporidae
      Sylvilagus 45
  Order Rodentia
    Suborder Sciuromorpha
    Family Sciuridae
      Sciurus 45
    Family Heteromyidae
      Heteromys 46

Suborder Myomorpha
  Family Muridae
    Subfamily Cricetinae
      Oryzomys 47
      Neacomys 49
      Nectomys 49
      Rhipidomys 50
      Thomasomys 51
      Chilomys 51
      Akodon 51
      Microxus 52
      Zygodontomys 52
      Calomys 53
      Holochilus 53
      Sigmodon 53
      Sigmomys 53
      Anotomys 53
      Daptomys 54
    Subfamily Murinae
      Rattus 54
      Mus 54
Suborder Caviomorpha
  Family Erethizontidae
      Coendou 55
  Family Caviidae
      Cavia 55
  Family Hydrochaeridae
      Hydrochaeris 55
  Family Dasyproctidae
      Agouti 55
      Dasyprocta 56
      Myoprocta 56
  Family Echimyidae
      Proechimys 56
      Mesomys 57
      Isothrix 57
      Echimys 57
Order Cetacea
  Family Platanistidae
      Inia 58
Order Carnivora
  Family Canidae
      Urocyon 58
      Cerdocyon 58
  Family Ursidae
      Tremarctos 58
  Family Procyonidae
      Procyon 58
      Nasua 59
      Nasuella 59
      Potos 59
      Bassaricyon 59
  Family Mustelidae
      Mustela 59
      Eira 59
      Galictis 60
      Conepatus 60
      Lutra 60
      Pteronura 60
  Family Felidae
      Felis 60
Order Perissodactyla
  Family Tapiridae
      Tapirus 61
Order Artiodactyla
  Family Tayassuidae
      Tayassu 61
      Dicotyles 61
  Family Cervidae
      Odocoileus 61
      Mazama 62
GAZETTEER 62
LITERATURE CITED 85

MAMMALS OF THE SMITHSONIAN VENEZUELAN PROJECT

by

Charles O. Handley, Jr.[1]

ABSTRACT

Mammals and their ectoparasites were collected in all parts of Venezuela between 1965 and 1968 by the Smithsonian Venezuelan Project. Ecological and geographical data are summarized here for 38,213 specimens of 270 species of mammals obtained by the project.

INTRODUCTION

Background

The Smithsonian Venezuelan Project had its roots in the collections of mammals and ectoparasites accumulated in Panamá in the late 1950s and early 1960s by many investigators associated with the Gorgas Memorial Laboratory, Middle America Research Unit, U.S. Army Malaria Control Unit, and Smithsonian Institution. These diverse collections and data were brought together belatedly through the cooperative effort of many scientists in *The Ectoparasites of Panama,* edited by Wenzel and Tipton (1966). The logical follow-up of the Panamanian work was a similar cooperative effort with preplanned objectives and uniform data collection techniques.

Venezuela was selected as the site of the new project because it had 1) a large and diverse fauna, part of which was related to the now familiar Panamanian fauna; 2) an exceptionally good and extensive system of roads and airstrips; 3) a wide spectrum of well-documented endemic arthropod-borne viral diseases; 4) a friendly and interested scientific community; and 5) a stable political environment.

Objectives

The project was titled at the outset, "Distribution and ecology of mammalian ectoparasites, arboviruses, and their hosts in Venezuela." Its objectives were to 1) collect as large and representative a sample of mammals as possible in all parts of Venezuela; 2) collect whole populations of ectoparasites from as many mammals as possible; 3) collect a standard set of biological, geographical, and ecological data with every specimen; 4) develop standard procedures for conduct of extensive epidemiological surveys; 5) convert all data to machine-readable form; 6) publish monographs or summary papers on the mammals and on each group of parasites; 7) study mammal-parasite-habitat relationships.

The first group of summary papers on the parasites was published as volume 17, *Brigham Young University Science Bulletin,* 1972. The second group of papers constitutes volume 20, *Brigham Young University Science Bulletin,* 1975-76. Work is underway on a larger "Mammals of Venezuela" and on the mammal-parasite-habitat correlations. To date the project collections have been the basis of about fifty papers.

Personnel

A consortium of scientists who agreed to study and report on parts of the collection was gathered in the planning stage of the project, and about thirty scientists—entomologists, mammalogists, virologists, and ecologists—in seven countries have participated.

Charles O. Handley, Jr., and V. J. Tipton, who coordinated the project, visited Caracas in May 1965 to discuss the proposed project with the Venezuelan scientists. The first field group reached Venezuela the following July, and thereafter project personnel were in Venezuela almost continuously until September 1968, on a 1 September to 31 August rotation schedule.

The field groups were constituted as follows:

1965-1966
  Group I—Norman E. Peterson, leader
    Jim Flanigan
    Chris Parrish

---

[1] Smithsonian Institution, Washington, D.C. 20560

    - Martin L. Taylor
    - David G. Young
  - Group II—Merlin D. Tuttle, leader
    - Arden L. Tuttle
    - Claudette H. Tuttle
- 1966-1967
  - Group I—Norman E. Peterson, leader
    - Daniel B. Peacock
    - Richard B. Peacock
  - Group II—Merlin D. Tuttle, leader
    - Fred L. Harder
    - Virginia E. Harder
    - Claudette H. Tuttle
- 1967-1968
  - Group I—Norman E. Peterson, leader
    - Fred P. Brown, Jr.
    - John O. Matson
  - Group II—Arden L. Tuttle, leader
    - Benjamin Inquilla
    - Ernest L. Stromeyer
    - Charlotte A. Tuttle

The following also participated briefly in the field work: D. P. Furman, C. O. Handley, Jr., C. L. Hayward, Carlos Machado, Carlos Naranjo, Juhani Ojasti, R. H. Pine, V. J. Tipton, and C. E. Yunker.

Collections

Major collections were made in nineteen of the twenty-four states, territories, districts, and dependencies in Venezuela in an attempt to gain adequate samples of all of the faunas. Unfortunately there are several important gaps in the collections because significant regions were not sampled. Another year of field work would have been required to complete the sampling to perfection. The areas missed were: BOLÍVAR, Serranía de Imataca, the tepuís, and upper Río Caura; DEPENDENCIAS FEDERAL, the Caribbean islands; GUÁRICO, the central Llanos; SUCRE, Cerro Turimiquire; TÁCHIRA, Páramo Batallón and trans-Andean passes near Independencia; T. F. AMAZONAS, Río Negro, Cerro de la Neblina, and other peaks along the Brazilian frontier; T. F. DELTA AMACURO, Río Orinoco delta and Guyana border region; and ZULIA, higher elevations in the Sierra de Perijá.

As far as possible the field personnel used a variety of collecting techniques, including trapping, netting, hunting, and purchase at each major sampling point. Mammals were taken at 100 localities, 25 of which were represented by more than 500 specimens (11 above 1,000; maximum 5,642 at San Juan Río Manapiare). Altogether there are records for 38,213 mammals, representing at least 270 species. Among these are 12 species which had not been described at the time of their collection, as well as numerous others which had not been taken previously in Venezuela.

The 270 species represented in the collections include nearly 90 percent of the land and fresh water mammalian fauna of Venezuela. Those missing from the collections, which ought to occur or which are known by previous collections to occur in Venezuela, are as follows (with an indication of where they should be sought):

Marmosa tyleriana Tate, tepuís of Bolívar and T. F. Amazonas

Saccopteryx gymnura Thomas, southern Venezuela

Peronymus leucopterus Peters, southern Venezuela

Centronycteris maximiliani Fischer, any place in Venezuela

Cyttarops alecto Thomas, southern and western Venezuela

Micronycteris pusilla Sanborn, southern Venezuela

Glyphonycteris daviesi Hill, anywhere in Venezuela

Mimon bennettii Gray, anywhere in Venezuela

Phyllostomus latifolius Thomas, Bolívar

Rhinophylla fischerae Carter, southern Venezuela

Vampyressa brocki Peterson, southern Venezuela

Thyroptera discifera Lichtenstein and Peters, northern Venezuela

Lasiurus egregius Peters, anywhere in Venezuela

Tadarida aurispinosa Peale, anywhere in Venezuela

Tadarida macrotis Gray, mountains of Venezuela

Eumops maurus Thomas, Bolívar

Eumops perotis Schinz, northern Venezuela

Eumops trumbulli Thomas, southern Venezuela

Cabassous unicinctus Linnaeus, anywhere in Venezuela

Sciurus flammifer Thomas, Bolívar

Neacomys guianae Thomas, Bolívar

Rhipidomys sclateri Thomas, Bolívar

Podoxymys roraimae Anthony, tepuís of Bolívar

Ichthyomys hydrobates Winge, Andes

Ichthyomys pittieri Handley and Mondolfi, Sierra de la Costa

Coendou melanurus Wagner, southern Venezuela

Hydrochaeris isthmius Goldman, Zulia

Dasyprocta guamara Ojasti, T. F. Delta Amacuro

Thrinacodus edax Thomas, Andes

Sotalia guianensis Van Beneden, Maracaibo and Orinoco basins

Speothos venaticus Lund, anywhere in Venezuela

Trichechus inunguis Natterer, southern T. F. Amazonas

Trichechus manatus Linnaeus, Río Orinoco drainage

Mazama rufina Bourcier and Pucheran, Andes

Most individuals of the uncommon kinds of mammals and a sample of each of the common kinds were searched for arthropod ectoparasites. Whenever a mammal was examined for parasites, an attempt was made to recover every parasite on it. In all, nearly 25,000 mammals were searched for parasites. All of the collections came originally to the Smithsonian, where the mammals were retained to be studied. The arthropods were distributed widely to specialists for study. Upon completion of studies the collection of mammals is being divided between the Smithsonian Institution and the government of Venezuela. The collections of parasites are being divided among the Smithsonian, the entomologists, and Venezuela.

Data

A data sheet with eighty-column format was filled out in the field for each mammal. Data categories included geographical information (locality code, latitude, longitude, and elevation), ecological information (vegetative life zone, capture site, cover, forest succession, site moisture, and topography), capture information (date, time, precipitation, light, wind, collecting device, bait, and amount of collecting effort), parasite information (kinds of parasites and location on host), and host information (sex, age, reproductive condition, number and size of embryos, stomach contents, external measurements, parts saved, and field number). A single set of field numbers was used throughout the project, and the same number was used for all parts of an individual collection (*i.e.*, data, parasites, skin, skull, blood, viscera, etc.).

At the Smithsonian the data sheets were edited for consistency and accuracy and were marked for keypunching. Then the carded data were transferred to magnetic tape. A verified host list, arranged by SVP* number, was one of the early products of the machine-readable data base. This was used by the entomologists to associate host names with SVP numbers in vials of parasites.

Later, after much geographical research, a precise gazetteer was completed. Standardized locality data were taped and used to override the less exact geographical data of the field sheets. Next, a master printout of the 38,213 mammal records, arranged by species and amounting to 229,296 lines, was run off. Other programs sorted and summarized the data base for each species by locality and by various ecological parameters. For example, altitudinal distribution was sorted for each species in blocks of 500 meters and the exact minimum and maximum were listed. Volunteers collected data for individual species from each of the printouts. These data were then converted to a narrative form for the accounts of species.

Format of Accounts of Species

Nomenclature

Arrangement of families and genera, with minor exceptions, follows Simpson (1945). Species are arranged alphabetically. The original citation for each species is included in the LITERATURE CITED section. Except in a few instances, identified by footnotes, each reference was actually examined. Ignored here, for the sake of brevity, subspecies and synonymys of Venezuelan mammals will be the subjects of future papers. Another paper (Handley, in press) describes and names the new species, here given alphabetical designations, and discusses departures from conventional nomenclature (as found, for example, in Cabrera, 1958 and 1961).

General Distribution Statement

Each species account begins with a general statement of geographical distribution of the species in Venezuela, *referring only to the Smithsonian Venezuelan Project collections.* Usually, but not always, this closely approximates the known range of the species computed from all sources.

Ecological Parameters

Following the general statement of geographical distribution, frequency of distribution within several ecological parameters is indicated. The parameters are capture site, site moisture, cover, elevation, and vegetative life zone. In the species accounts these are telescoped into a single sentence, each parameter set off by semicolons. Except where sample size was very small, frequency of collection in various categories is expressed as percentages of the total for each parameter. *The percentages do not transcend semicolons.*

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*(SVP = Smithsonian Venezuelan Project)

Capture site categories on the field data sheet included mist net; on ground; beside log; on log; on, in, or beside rock; at base of tree; in tree; in cavern; in house. On ground, beside log, beside rock, and at base of tree are usually combined as "on ground" in the species accounts. "On ground" also includes in underbrush and in brush pile. "In tree" includes in tree, in vines, on tree limb, and on tree trunk.

Site moisture categories on the field data sheet included dry, moist, near stream, beside stream, in stream (or over stream). "In moist areas" should be interpreted usually as "mesic," but "dry" doesn't always mean "xeric." A dry yard or forest may simply mean "not damp or not wet."

Cover categories on the field data sheet included thorn forest, deciduous forest, evergreen forest, cloud forest, swamp or marsh, savanna or pasture, cropland, orchard, yard. Pasture, cropland, orchard, and yard are often combined in the species accounts as "openings" or "clearings" in one or the other of the forest types. "Orchards" include such diverse plantings as coconut groves, orange groves, scattered mangos, coffee plantations, and banana plantations. "Savanna or pasture" includes páramo.

Elevation was recorded to the nearest meter in the field. The computer sorted elevations to minimum and maximum and into 500 meter increments. The species accounts comment on skewness of frequency toward upper or lower limits. No comment signifies uniform distribution.

Vegetative life zone for each collection was inferred from the map and descriptive text of Ewel and Madriz (1968), in conjunction with the elevation and gazetteer description of the collecting locality. The species accounts list *actual numbers of mammals* rather than percentages for each life zone since it often happened that a few specimens were scattered through many life zones in a species sample. The life zones of Ewel and Madriz (1968) are abbreviated in the species accounts. See Table 1 for translation of the abbreviations and for the equivalent terms from Holdridge (1947).

Specimens Collected

The specimens of each species are listed by locality. The localities are listed alphabetically by state. Localities on the boundary between two or more states are listed at the end of the alphabetical sequence.

The lists of "specimens collected" include all of the specimens for which records were kept. *They therefore are not lists of specimens preserved*, since some specimens were lost or discarded in the field. Some of the mammals for which records were kept but for which no specimen was preserved could not be identified with certainty to species. These are mentioned without ecological comment in the species accounts as "*Carollia* sp.?" etc.

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ACCOUNTS OF SPECIES

Order MARSUPIALIA

Family DIDELPHIDAE

Caluromys lanatus Olfers, 1818:206.

Maracaibo lowlands, Andean foothills, and T. F. Amazonas. In trees (100 percent); usually near streams or other moist areas (90 percent) but sometimes in dry places (10 percent); in evergreen forest (100 percent); 24-155 m; bs-T (2), bh-T (10), and bmh-T (9).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (3). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (5); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (5); 30 km S Pto. Ayacucho, 126 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (3). TRUJILLO, 25 km NNW Valera, 90 m, (2). ZULIA, El Rosario, 51 km WNW Encontrados, 37 m, (1). Total 21.

Caluromys philander Linnaeus, 1758:54.

Forested areas east of the Andes. Usually taken in trees (94 percent) or rarely on logs and on the ground (6 percent); near streams and in other moist areas (90 percent) or in dry places (10 percent); in evergreen forest (52 percent), orchards (34 percent), other openings such as yards, croplands, and pastures (11 percent), and thorn forest (3 percent); 25-1,600 m (96 percent below 1,200 m); bms-T (2), bh-T (9), bmh-T (13), bs-P (7), bh-P (36), bp-P (1), bh-MB (2), and bmh-MB (1).

Specimens collected: BOLÍVAR, Los Patos, 28 km SE El Manteco, 150 m, (1). CARABOBO, nr. Montalbán, 598 m, (7). DTO. FEDERAL, I.V.I.C., 15 km SW Caracas, 1,600 m, (1); Los Venados, 4 km NNW Caracas, 1,500 m, (2).

Table 1. Vegetative life zones of Venezuela.

Abbreviation	Ewel and Madriz (1968)	Holdridge (1947)
md-T	Tropical scrub desert	Tropical desert bush
me-T	Tropical thorny forest	Tropical thorn forest
bms-T	Tropical very dry forest	Tropical very dry forest
bs-T	Tropical dry forest	Tropical dry forest
bh-T	Tropical humid forest	Tropical moist forest
bmh-T	Tropical very humid forest	Tropical wet forest
me-P	Premontane thorny forest	Subtropical thorn forest
bs-P	Premontane dry forest	Subtropical dry forest
bh-P	Premontane humid forest	Subtropical moist forest
bmh-P	Premontane very humid forest	Subtropical wet forest
bp-P	Premontane rain forest	Subtropical rain forest
bs-MB	Lower Montane dry forest	Lower Montane dry forest
bh-MB	Lower Montane humid forest	Lower Montane moist forest
bmh-MB	Lower Montane very humid forest	Lower Montane wet forest
bp-MB	Lower Montane rain forest	Lower Montane rain forest
bh-M	Montane humid forest	Montane moist forest
bmh-M	Montane very humid forest	Montane wet forest
bp-M	Montane rain forest	Montane rain forest
p-SA	Subalpine páramo	Subalpine wet páramo
pp-SA	Subalpine rainy páramo	Subalpine rain formation

FALCÓN, 14 km ENE Mirimire, 122 m, (1); 19 km NW Urama, 25 m, (1). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160 m, (1). MONAGAS, San Agustín, 3 to 5 km NW Caripe, 1,170-1,180 m, (25). SUCRE, 21 km E Cumaná, 25-30 m, (2); Manacal, 26 km ESE Carúpano, 180-575 m, (8). T.F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (13); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 750 m, (1); 30 km S Pto. Ayacucho, 126 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (4); Tamatama, Río Orinoco, 135 m, (2). Total 71.

Monodelphis brevicaudata Erxleben, 1777:80.

Apparently discrete populations in northern Venezuela (Sucre to Zulia), the Llanos, and southern Venezuela. On the ground (96 percent) or rarely on logs and in trees (4 percent); near streams and in other moist areas (88 percent) or in dry sites (12 percent); in evergreen forest (49 percent), in openings such as pasture, croplands, yards, and orchards (44 percent), and less often (7 percent) in other types of forest (swamp, thorn, deciduous, and cloud); 1-1,160 m; bs-T (32), bh-T (38), bmh-T (1), bs-P (13), bh-P (22), and bmh-P (21).

Specimens collected: ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,050-1,100 m, (10). BARINAS, Altamira, 697-794 m, (7). BOLÍVAR, El Manaco, 68 km SE El Dorado, 150 m, (1); 18 to 45 km NE Icabarú, 741-851 m, (5); Río Supamo, 50 km SE El Manteco, 150 m, (1). CARABOBO, Montalbán to 6 km E and S Montalbán, 562-598 m, (13). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (1). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (1); nr. Mirimire and up to 14 km ENE Mirimire, 85-250 m, (11). GUÁRICO, Est. Biol. de los Llanos, 9 km SE Calabozo, 100 m, (10); Parque Nac. Guatopo, 15 km NW Altagracia, 680 m, (1). MIRANDA, Birongo, 60 m, (1); Curupao, 5 km NNW Guarenas, 1,160 m, (2); 6 km SSE Río Chico, 1 m, (5). SUCRE, Manacal, 26 km ESE Carúpano, 415-417 m, (2). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (3); Esmeralda, Río Orinoco, 135 m, (1); 30 to 32 km S Pto. Ayacucho, 114-135 m, (5); Tamatama, Río Orinoco, 130-135 m, (11). TRUJILLO, La Ceiba, 52 km WNW Valera, 29 m, (3); 12 to 30 km N, NW, and WNW Valera, 61-930 m, (17). YARACUY, Minas de Aroa, 20 km NW San Felipe, 400-430 m, (6). ZULIA, Kasmera, 21 km SW Machiques, 272-273 m, (2). CARABOBO, FALCÓN, and YARACUY, 10 to 19 km NW Urama, 25 m, (6). Total 127.

Marmosa cinerea Temminck, 1824:46.

Bolívar, T. F. Amazonas, and Sierra de la Costa of northern Venezuela. Captured in trees, vines, and on logs (53 percent) or on the ground (47 percent); near streams or in other moist situations (96 percent) and rarely in dry places (4 percent); in evergreen forest (71 percent) or in openings such as yards, orchards, and marshes (29 percent); 25-1,160 m (77 percent below 325 m); bs-T (8), bh-T (13), bmh-T (2), bh-P (2), bmh-P (5), and bp-P (1).

Specimens collected: ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,050 m, (3). BOLÍVAR, Hato La Florida, 44 to 47 km ESE Caicara, 43-50 m, (6); Hato San José, 20 km W La Paragua, 306 m, (2); Km 125, 85 km SSE El Dorado, 324-1,032 m, (2). FALCÓN, 19 km NW Urama, 25 m, (4). MIRANDA, Curupao, 5 km NNW Guarenas, 1,150-1,160 m, (2). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 750 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (5); 30 to 32 km S Pto. Ayacucho, 126-135 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2). Total 31.

Marmosa dryas Thomas, 1898:456.

Mérida and Táchira Andes. On the ground (50 percent) or in trees (50 percent); usually in moist sites (90 percent) but occasionally in dry places (10 percent); in cloud forest (100 percent); 2,210-2,632 m; bmh-MB (8) and bp-M (2).

Specimens collected: MÉRIDA, 6 km ESE Tabay, 2,630-2,632 m, (2). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,405-2,410 m, (2). TRUJILLO, Hda. Misisí, 14 to 15 km E Trujillo, 2,210-2,360 m, (6). Total 10.

Marmosa fuscata Thomas, 1896:313.

Mountains of northern Venezuela. In trees and vines (71 percent) or on the ground (29 percent); near streams or in other moist areas (100 percent); in evergreen (56 percent) and cloud forest (41 percent) and in forest openings used for crops (3 percent); 1,050-2,350 m; bh-P (11), bmh-P (17), bh-MB (10), and bmh-MB (26).

Specimens collected: ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,050 m, (2). CARABOBO, La Copa, 4 km NW Montalbán, 1,513-1,537 m, (15). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,443-1,500 m, (5). MIRANDA, Alto Ño León, 31 to 33 km WSW Caracas, 1,750-2,000 m, (5); Curupao, 5 km NNW Guarenas, 1,160 m, (1); I.V.I.C., 15 km SW Caracas, 1,460 m, (5); Pico Ávila, 5 km NNE Caracas, 1,281-2,232 m, (19). MONAGAS, San Agustín, 5 km NW Caripe, 1,150-1,339 m, (10). TRUJILLO, Hda. Misisí, 14 to 15 km E Trujillo, 2,210-2,350 m, (2). Total 64.

Marmosa impavida Tschudi, 1845:149.

Táchira Andes. In trees, shrubs, or vines (63 percent) or on leaf litter at the base of trees and vines (37 percent); in moist (88 percent) or rarely in dry situations (12 percent); in cloud (88 percent) or evergreen forest (12 percent); 2,380-2,415 m; bmh-MB (8).

Specimens collected: TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,380-2,415 m, (8). Total 8.

Marmosa marica Thomas, 1898:455.

Northern Venezuela. In trees (83 percent) and in a fence post (17 percent); in moist sites (100 percent); in evergreen (43 percent) or deciduous forest (14 percent), and in savanna (43 percent); 18-2,135 m; bs-T (3), bh-T (1), bh-MB (1), and bmh-MB (2).

Specimens collected: DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,500 m, (1); Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,124-2,135 m, (2). FALCÓN, 19 km NW Urama, 25 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (3). Total 7.

Marmosa murina Linnaeus, 1758:55.

Bolívar, T. F. Amazonas, and scattered localities in northern Venezuela. On the ground (48 percent) or on logs, in trees, and in houses (52 percent); usually near streams or other moist areas (90 percent) but occasionally in dry sites (10 percent); in evergreen forest (88 percent) or openings such as pastures, orchards, and yards (12 percent); 25-1,365 m; bs-T (4), bh-T (28), bmh-T (1), bh-P (13), and bmh-P (25).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (4); Hato San José, 20 km W La Paragua, 306 m, (1); 45 km NE Icabarú, 851 m, (4); Km 125, 85 km SSE El Dorado, 1,032 m, (21); Los Patos, 28 km SE El Manteco, 350 m, (1); Río Supamo, 50 km SE El Manteco, 350 m, (1). MONAGAS, San Agustín, 5 km NW Caripe, 1,260-1,365 m, (11). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (2); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (4); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (14). YARACUY, 10 km NW Urama, 25 m, (3). ZULIA, El Rosario, 48 to 63 km WNW Encontrados, 54-125 m, (3). Total 71.

Marmosa parvidens Tate, 1931:13.

T. F. Amazonas, Bolívar, and Falcón. Captured on the ground (67 percent) and in a tree (33 percent); near streams or other moist areas (100 percent); in evergreen forest (100 percent); 25-1,032 m; bh-T (3) and bmh-P (2).

Specimens collected: BOLÍVAR, Km 125, 85 km SSE El Dorado, 1,032 m, (2). FALCÓN, 19 km NW Urama, 25 m, (1). T. F. AMAZONAS, Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (2). Total 5.

Marmosa robinsoni Bangs, 1898:95.

Northern Venezuela. Usually captured on the ground (66 percent) or in trees (34 percent); near streams or in other moist areas (65 percent) and often in dry sites (35 percent); in evergreen or cloud forest (42 percent), openings (33 percent), or deciduous and thorn forest (25 percent); 1-1,260 m (62 percent below 500 m); bms-T (17), bs-T (118), bh-T (16), me-P (2), bs-P (11), bh-P (25), bmh-P (65), and bmh-MB (2).

Specimens collected: BARINAS, Altamira, 697 m, (1). CARABOBO, nr. Montalbán, 562-1,000 m, (9). FALCÓN, Cerro Santa Ana, Península de Paraguaná, 15 km SSW Pueblo Nuevo, 500-615 m, (62); Cerro Socopo, 84 km NW Carora, 1,258-1,260 m, (2); nr. Mirimire and nr. La Pastora, 14 km ENE Mirimire, 90-250 m, (2); Río Socopito, 80 km NW Carora, 470 m, (1). GUÁRICO, Est. Biol. de los Llanos, 9 km SE Calabozo, 100-115 m, (35); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (46). LARA, Caserio Boro, 10 to 14 km NE and N El Tocuyo, 528-616 m, (3); La Concordia, 47 km NE El Tocuyo, 592 m, (1). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160 m, (8); San Andrés, 16 km SSE Caracas, 1,144 m, (6). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (13); San Agustín, 5 km NW Caripe, 1,150 m, (1). NUEVA ESPARTA, Isla Margarita, 3 km NNE, NE, and S La Asunción, 37-425 m, (15). SUCRE, 16 to 21 km E Cumaná, 1-25 m, (10). TRUJILLO, La Ceiba, 52 km WNW Valera, 29 m, (1); 12 to 25 km N, NW, and WNW Valera, 90-930 m, (9). ZULIA, nr. Cerro Azul, 35 to 40 km NW La Paz, 80 m, (7); Novito, 19 km WSW Machiques, 1,132-1,150 m, (2). CARABOBO, FALCÓN, and YARACUY, 10 to 19 km NW Urama, 25 m, (22). Total 256.

Marmosa sp. A.

Falcón. Captured at the bases of trees in moist evergreen forest; 125-170 m; bh-P (3).

Specimens collected: FALCÓN, nr. La Pastora, 14 km ENE Mirimire, 125-170 m, (3). Total 3.

Remarks: For notes on the systematics and nomenclature of this species, see Handley (in press).

Marmosa sp. B.

Desert areas around Golfo de Venezuela. Usually captured in trees and bushes (81 percent) or on the ground (18 percent) and rarely in houses (1 percent); almost always in dry situations (99 percent) but rarely in moist places (1 percent); in thorn forest (98 percent), forest openings (2 percent), and evergreen forest (less than 1 percent); 5-90 m; me-T (205) and bms-T (41).

Specimens collected: FALCÓN, Capatárida and 16 to 18 km WSW and SSW Capatárida, 40-75 m, (135); Península de Paraguaná, 15 to 25 km SSW and SW Pueblo Nuevo, 13-90 m, (73). GUAJIRA and ZULIA, nr. Cojoro, 34 to 37 km NNE Paraguaipoa, 5-15 m, (38). Total 246.

Remarks: For notes on the systematics and nomenclature of this species, see Handley (in press).

Marmosa sp. ?

Specimens collected: FALCÓN, Península de Paraguaná, 15 to 25 km SSW and SW Pueblo Nuevo, 13-593 m, (5). GUÁRICO, Est. Biol. de los Llanos, 9 km SE Calabozo, 100 m, (3). MONAGAS, nr. San Agustín, 5 km NW Caripe, 1,150-1,338 m, (2). Total 10.

Philander opossum Linnaeus, 1758:55.

Lowlands of western and southern Venezuela. On the ground (98 percent) and on a log (2 percent); near streams and in other moist areas (100 percent); in evergreen forest (91 percent) and openings such as orchards, croplands, and yards (9 percent); 24-324 m; bs-T (2), bh-T (29), and bmh-T (15).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (3). BOLÍVAR, Hato San José, 20 km W La Paragua, 306-324 m, (2). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (11); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (3); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (10); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (3); Tamatama, Río Orinoco, 135 m, (9). TRUJILLO, 19 to 30 km N and NW Valera, 90-164 m, (2). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (2). Total 46.

Metachirus nudicaudatus E. Geoffroy, 1803:142.

Western and southern Venezuela. On the ground (100 percent); near streams and other moist areas (73 percent) or in dry situations (27 percent); in evergreen forest (73 percent) and in orchards and yards (27 percent); 130-1,150 m; bh-T (10), bh-P (2), and bmh-P (6).

Specimens collected: BARINAS, Altamira, 697-794 m, (3). BOLÍVAR, 28 km NE Icabarú, 775 m, (2). T. F. AMAZONAS, Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (2); Tamatama, Río Orinoco, 135 m, (4). TRUJILLO, 19 km N Valera, 164 m, (3). ZULIA, Kasmera, 21 km SW Machiques, 270 m, (1); Novito, 19 km WSW Machiques, 1,135-1,150 m, (3). Total 18.

Lutreolina crassicaudata Desmarest, 1804:19.

Bolívar. On the ground, in grass 0.5-1.5 m high, near a stream and in dry upland pasture with scattered bushes and palms; 298 m; bs-T (4).

Specimens collected: BOLÍVAR, Hato San José, 20 km W La Paragua, 298 m, (4). Total 4.

Didelphis albiventris Lund, 1841:236.

Mérida and Táchira Andes. On the ground (86 percent) or in trees (14 percent); in dry situations (54 percent) or near streams and other moist areas (46 percent); in evergreen (53 percent) or cloud forest (47 percent); 2,380-3,275 m; bmh-MB (5), bh-M (6), bp-M (1), and p-SA (2).

Specimens collected: MÉRIDA, Paramito, 3 to 4 km W Timotes, 3,020-3,275 m, (8); 7 km SE Tabay, 3,155 m, (1). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,380-2,390 m, (5). Total 14.

Didelphis marsupialis Linnaeus, 1758:54.

Throughout Venezuela, except at high elevations and in deserts. Usually captured on the ground (72 percent) or in trees, on logs, or in houses (28 percent); most often near streams or in other moist areas (88 percent) but sometimes in dry places (12 percent); in evergreen (52 percent) and cloud forest (6 percent), deciduous and thorn forest (5 percent), or in openings such as yards, orchards, pastures, and croplands (37 percent); 1-2,232 m (56 percent below 500 m, 98 percent below 1,500 m); bms-T (15), bs-T (92), bh-T (51), bmh-T (9), me-P (1), bs-P (74), bh-P (99), bmh-P (16), bh-MB (8), and bmh-MB (17).

Specimens collected: ANZOÁTEGUI, 14 km W Clarines, 100 m, (1). APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (2); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (1). ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,100 m, (2). BARINAS, Altamira, 794 m, (7). BOLÍVAR, Hato La Florida, 44 km ESE Caicara, 43-45 m, (15); Hato San José, 20 km W La Paragua, 324 m, (2); 23-45 km NE Icabarú, 851 m, (2); Km 125, 85 km SSE El Dorado, 1,032-1,165 m, (3); Río Supamo, 50 km SE El Manteco, 150 m, (2). CARABOBO, nr. Montalbán, 562-1,000 m, (49). DTO. FEDERAL, Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (2); Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (1); Los Venados, 4 km NNW Caracas, 1,475 m, (2). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (2); nr. Mirimire and 14 km ENE Mirimire, 130-250 m, (5); Río Socopito, 80 km NW Carora, 480 m, (1). GUÁRICO, Est. Biol. de los Llanos, 14 km SE Calabozo, 100 m, (1). LARA, Caserio Boro, 10 to 47 km N and NE El Tocuyo, 518-900 m, (8). MÉRIDA, 4 km E Tabay, 2,100 m, (1). MIRANDA, Alto Ño León, 31 km WSW Caracas, 1,880 m, (1); 3 km NE Caracas, 1,110-1,170 m, (32); I.V.I.C., 15 km SW Caracas, 1,460-1,660 m, (16); Parque Nac. Guatopo, 15 to 21 km NW Altagracia, 630-680 m, (16); 1 to 6 km S and SSE Río Chico, 1 m, (5); San Andrés, 16 km SSE Caracas, 1,140-1,144 m, (2). MONAGAS, Hato Mata de Bejuco, 55 SSE Maturín, 18 m, (10); San Agustín, 5 km NW Caripe, 1,160-1,335 m, (18). SUCRE, 2 to 24 km E Cumaná, 1-30 m, (7); Ensenada Cuaranta, 9 km NE Güiria, 1-4 m, (14); Manacal, 26 km ESE Carúpano, 185-470 m, (42). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (2). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150-1,460 m, (7); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (5); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (6); 30 to 32 km S Pto. Ayacucho, 126-135 m, (7); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2); Tamatama, Río Orinoco, 135 m, (1). TRUJILLO, La Ceiba, 46 km WNW Valera, 29 m, (2); 12 to 30 km N to WNW Valera, 61-900 m, (22). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-1,400 m, (6). ZULIA, nr. Cerro Azul, 33 to 39 km NW La Paz, 75-80 m, (15); El Rosario, 45 to 60 km WNW Encontrados, 37-73 m, (13); Kasmera, 21 km SW Machiques, 270 m, (2). CARABOBO, FALCÓN, and YARACUY, 10 to 19 km NW Urama, 25 m, (15). DTO. FEDERAL and MIRANDA, Pico Ávila, 5 km NNE and 6 km NNW Caracas, 1,616-2,232 m, (3). Total 382.

Didelphis sp. A.

Bolívar and T. F. Amazonas. Captured in trees and on logs (53 percent) or on the ground (47 percent); near streams and other moist areas (100 percent); in evergreen forest (93 percent) and forest openings (7 percent); 126-1,400 m (77 percent above 700 m); bs-T (1), bh-T (3), bh-P (3), bmh-P (6), bp-P (2), and bp-MB (2).

Specimens collected: BOLÍVAR, 26 km NE Icabarú, 824 m, (3); Km 125, 85 km SSE El Dorado, 1,032 m, (6). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400 m, (2); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 750 m, (2); 20 to 30 km S Pto. Ayacucho, 126-135 m, (3). Total 17.

Remarks: For notes on the systematics and nomenclature of this species, see Handley (in press).

Chironectes minimus Zimmermann, 1780:317.

Mountains of northern and western Venezuela. In streams in evergreen forest and cultivated land; 395-1,860 m; bh-P (2) and bmh-MB (3).

Specimens collected: MÉRIDA, Santa Rosa, 1 km N Mérida, 1,860 m, (3). MONAGAS, San Agustín, 5 km NW Caripe, 1,150 m, (1). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395 m, (1). Total 5.

Family CAENOLESTIDAE

Caenolestes obscurus Thomas, 1895b:367.

Táchira. On the ground, 1.5-2 m from a stream, near shrubs and a bamboo thicket, in cloud forest; 2,390-2,400 m; bmh-MB (2).

Specimens collected: TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,390-2,400 m, (2). Total 2.

Order INSECTIVORA

Family SORICIDAE

Cryptotis thomasi Merriam, 1897:227.

Mérida and Táchira Andes. Taken on the ground (100 percent); usually in moist situations (85 percent) but occasionally in dry sites (15 percent); in cloud forest (94 percent) or páramo (6 percent); 1,980-3,545 m; bh-MB (3), bmh-MB (9), bp-M (6), and p-SA (3).

Specimens collected: MÉRIDA, La Carbonera, 12 km SE La Azulita, 1,990 m, (1); Santa Rosa, 2 km N Mérida, 1,980 m, (3); 5 to 9 km SE and ESE Tabay, 2,630-3,545 m, (9). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,380-2,415 m, (8). Total 21.

Order CHIROPTERA

Family EMBALLONURIDAE

Rhynchonycteris naso Wied, 1820b:251.

Throughout the lowlands of Venezuela. Caught in mist nets (58 percent) or from roosts on logs (21 percent), trees (15 percent), and rocks (6 percent); near streams and in other moist situations (97 percent) or in dry places (3 percent); in evergreen forest (71 percent), pastures and yards (18 percent), swamps (6 percent), and thorn forest (5 percent); 1-350 m; bms-T (1), bs-T (37), bh-T (75), bmh-T (38), and bh-P (9).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (2); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (5). BOLÍVAR, El Manaco, 59 to 67 km SE El Dorado, 150 m, (7); Hato La Florida, 47 km SE Caicara, 50 m, (3); Hato San José, 20 km W La Paragua, 306 m, (1); Río Supamo, 50 km SE El Manteco, 150-350 m, (9). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (10); 20 km NNE and ENE Mirimire, 1 m, (1). GUÁRICO, Est. Biol. de los Llanos, 14 km SE Calabozo, 100 m, (3). MIRANDA, 7 km N Río Chico, 1 m, (7). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (2). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (38); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (6); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (18); Río Mavaca, 108 km SSE Esmeralda, 140 m, (4); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (19); Tamatama, Río Orinoco, 135 m, (15). YARACUY, 10 km NW Urama, 25 m, (3). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (1); El Rosario, 42 to 57 km WNW Encontrados, 24-61 m, (6). Total 160.

Saccopteryx bilineata Temminck, 1838:33.

Humid lowland forests throughout Venezuela. Caught in mist nets (27 percent) and found roosting on trees (71 percent) and rocks (1 percent), on houses and in cave mouths (1 percent), and on logs (less than 1 percent); usually near streams (81 percent) and in moist areas (15 percent), but rarely in dry places (4 percent); in evergreen forest (65 percent), orchards (13 percent), swamps (12 percent), yards (8 percent), pastures (1 percent), and deciduous forest (1 percent); 1-630 m (99 percent below 500 m); bs-T (84), bh-T (301), bmh-T (25), bs-P (2), bh-P (5), and bmh-P (3).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (3); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (3); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (1); San Rafael de Atamaica, 42 km SSE San Fernando de Apure, 100 m, (10). BARINAS, 2 km SW Altamira, 620 m, (1). BOLÍVAR, Hato La Florida, 45 km ESE Caicara, 65 m, (1); Hato San José, 20 km W La Paragua, 306 m, (1); Río Supamo, 50 km SE El Manteco, 350 m, (1). CARABOBO, 2 km SE Montalbán, 598 m, (1). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (4); 12 to 14 km ENE Mirimire, 60-260 m, (2). MIRANDA, Birongo, 60 m, (2); Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (1); 5 to 7 km E and SSE Río Chico, 1 m, (9). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1). SUCRE, Ensenada Cauranta, 9 km NE Güiria, 1 m, (1); Manacal, 26 km ESE Carúpano, 200-575 m, (3). TÁCHIRA, Las Mesas, 17 km San Juan de Colón, 460 m, (2). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (22); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (24); 14 to 30 km S and SSW Pto. Ayacucho, 126-135 m, (3); Río Mavaca, 108 km SSE Esmeralda, 140 m, (6); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (246). TRUJILLO, 23 to 25 km NW Valera, 90-164 m, (2). ZULIA, nr. Cerro Azul, 33 to 39 km NW La Paz, 75-80 m, (50); El Rosario, 39 to 48 km WNW Encontrados, 37-54 m, (6). CARABOBO and FALCÓN, 5 to 19 km NW and ENE Urama, 25 m, (14). Total 420.

Saccopteryx canescens Thomas, 1901a:366.

Widely scattered Venezuelan lowland localities. Mist netted (100 percent); near streams and in other moist areas (75 percent) or in dry sites (25 percent); in openings such as pastures, yards, and orchards (60 percent), in evergreen forest (30 percent), and in thorn (5 percent) and swamp forest (5 percent); 1-155 m; bs-T (14) and bh-T (9).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 to 46 km NE Pto. Páez, 76 m, (5); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (2); San Rafael de Atamaica, 42 km SSE San Fernando de Apure, 100 m, (2). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (1); 19 km NW Urama, 25 m, (2). MIRANDA, Birongo, 60 m, (2); 7 to 10 km E and ESE Río Chico, 1 m, (2). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1). SUCRE, Ensenada Cauranta, 9 km NE Güiria, 2 m, (1). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (4). ZULIA, El Rosario, 51 km WNW Encontrados, 50 m, (1). Total 23.

Saccopteryx leptura Schreber, 1774: pl. 57 and p. 173.

Scattered lowland localities throughout Venezuela. Caught in mist nets (83 percent) and found roosting on logs (10 percent), in trees (5 percent), and on a house (2 percent); near streams and in other moist areas (82 percent) or in dry sites (18 percent); in evergreen forest (67 percent), yards, pastures, and orchards (18 percent), thorn forest (13 percent), and swamp (2 percent); 1-609 m (95 percent below 500 m); bms-T (1), bs-T (9), bh-T (21), bmh-T (6), bh-P (2), and bmh-P (2).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 km NE Pto. Páez, 76 m, (1); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2); 1 km W Pto. Páez, 76 m, (1). BARINAS, 2 km SW Altamira, 609 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Hato La Florida, 45 km ESE Caicara, 65 m, (1); Hato San José, 20 km W La Paragua, 306 m, (1). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (4). MIRANDA, Birongo, 60 m, (1); 1 km E Río Chico, 1 m, (1). SUCRE, 21 km E Cumaná, 40 m, (1); Manacal, 26 km ESE Carúpano, 575 m, (1). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (3); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); 32 km S Pto. Ayacucho, 135 m, (2); Río Mavaca, 108 km SSE Esmeralda, 140 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (10). YARACUY, Minas de Aroa, 20 km NW San Felipe, 400 m, (1). ZULIA, El Rosario, 48 km WNW Encontrados, 54 m, (1). Total 41.

Saccopteryx sp. ?

Specimens collected: T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 3.

Cormura brevirostris Wagner, 1843a:367.

Northeastern and southern Venezuela. Netted (50 percent), shot in flight (17 percent), or captured from roosts in hollow trees (11 percent) or logs (22 percent); near streams or other moist areas (100 percent); in evergreen forest (88 percent) and rarely in fields and yards (12 percent); 135-964 m (94 percent below 500 m); bs-T (1), bh-T (5), bmh-T (9), bs-P (1), bh-P (1), and bmh-P (1).

Specimens collected: BOLÍVAR, 40 km NE Icabarú, 964 m, (1); Río Supamo, 50 km SE El Manteco, 150 m, (1). SUCRE, Manacal, 26 km ESE Carúpano, 175 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (9); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (2); 32 and 65 km S and SSW Pto. Ayacucho, 135-161 m, (2); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 18.

Peropteryx kappleri Peters, 1867:473.

Widely scattered localities in northern Venezuela and Bolívar. Found roosting in caverns (74 percent) and among rocks (26 percent); in dry (62 percent) or moist situations (38 percent); in evergreen forest (76 percent) or in croplands (24 percent); 220-854 m; bs-T (1), bh-P (52), and bmh-P (1).

Specimens collected: BARINAS, Altamira, 794 m, (1). BOLÍVAR, 13 km NE Icabarú, 817 m, (1). CARABOBO, 14 km ENE Montalbán, 701 m, (11). FALCÓN, 6 to 12 km ENE Mirimire, 220-260 m, (27); Reicito, 30 km S Mirimire, 300 m, (1). MONAGAS, 3 km SW Caripe, 854 m, (13). Total 54.

Peropteryx macrotis Wagner, 1843a:367.

Humid lowlands of southern, central, and western Venezuela. Found roosting in caves (38 percent), rocks (31 percent), and houses (6 percent) or caught in mist nets (25 percent); usually near streams and in other moist areas (88 percent) but occasionally in dry places (12 percent); in evergreen forest (70 percent), openings such as savanna, yards, and orchards (27 percent), and in deciduous forest (3 percent); 65-817 m; bs-T (58), bh-T (50), bmh-T (3), bh-P (108), and bmh-P (1).

Specimens collected: APURE, 1 km W Pto. Páez, 76 m, (1); San Rafael de Atamaica, 42 km SSE San Fernando de Apure, 100 m, (14). BARINAS, Altamira, 600 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Hato La Florida, 45 km ESE Caicara, 65 m, (1); 11 to 19 km NE Icabarú, 700-817 m, (69); Piedra

Virgen, 70 km SSE El Dorado, 374 m, (9). CARABOBO, 14 km ENE Montalbán, 701 m, (11). FALCÓN, 13 km NNE and ENE Mirimire, 270 m, (12); Riecito, 30 km S Mirimire, 300 m, (29). GUÁRICO, Embalse de Guárico, 10 km N Calabozo, 100 m, (1). MIRANDA, Cueva Ricardo Zuloaga, nr. El Encontado, 15 km SE Caracas, 548 m, (7). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); Esmeralda, Río Orinoco, 135 m, (31); 20 to 35 km SSW Pto. Ayacucho, 119-195 m, (6); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2). YARACUY, Minas de Aroa, 20 km NW San Felipe, 390-400 m, (16). ZULIA, El Rosario, 42 km NW Encontrados, 24 m, (1); Kasmera, 21 km SW Machiques, 270 m, (5). Total 220.

Peropteryx trinitatis Miller, 1899:178.

Lowlands of southern and central northern Venezuela. Found roosting in rocks (50 percent), caverns (22 percent), and houses (18 percent), or caught in nets (10 percent); in dry areas (75 percent) or in moist sites (25 percent); in savanna and pasture (62 percent), yards (21 percent), evergreen forest (15 percent), and swamps (2 percent); 76-400 m; bs-T (37), bh-T (6), and bh-P (18).

Specimens collected: APURE, Pto. Páez, 76 m, (33). BOLÍVAR, Piedra Virgen, 70 km SSE El Dorado, 374 m, (2). FALCÓN, 13 km NNE and ENE Mirimire, 270 m, (6). MIRANDA, 4 km SW Birongo, 195 m, (1). T .F. AMAZONAS, 14 to 32 km S and SSW Pto. Ayacucho, 119-174 m, (6); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). YARACUY, Minas de Aroa, 20 km NW San Felipe, 390-400 m, (12). Total 61.

Diclidurus albus Wied, 1820a (1819):1630.

Bolívar, T. F. Amazonas, and Zulia. Shot in flight (100 percent); near stream banks and other moist areas (87 percent) or in dry sites (13 percent); over yards and streets in towns (87 percent) or in evergreen and cloud forest (13 percent); 24-851 m; bs-T (2), bh-T (18), and bh-P (3).

Specimens collected: BOLÍVAR, Icabarú to 21 km NE Icabarú, 473-851 m, (5). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (7). ZULIA, El Rosario, 39 to 42 km WNW Encontrados, 24-37 m, (11). Total 23.

Diclidurus ingens Hernández Camacho, 1955:87.

T. F. Amazonas. Shot in flight (100 percent); over stream banks and other moist areas (100 percent); in yards (75 percent) or in evergreen forest (25 percent); 99-155 m; bs-T (2) and bh-T (2).

Specimens collected: T. F. Amazonas, Pto. Ayacucho, 99 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2). Total 4.

Diclidurus isabellus Thomas, 1920b:271.

T. F. Amazonas. Shot in flight (100 percent); over streams or stream banks (100 percent); in evergreen forest (100 percent); 138-155 m; bh-T (28).

Specimens collected: T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (9); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (18). Total 28.

Diclidurus scutatus Peters, 1869:400.

Bolívar and T. F. Amazonas. Shot in flight (100 percent); near stream banks and other moist areas (100 percent); over yards and streets in towns (100 percent); 99-851 m; bs-T (12), bh-T (1), and bh-P (1).

Specimens collected: BOLÍVAR, Icabarú to 21 km NE Icabarú, 473-851 m, (11). T. F. AMAZONAS, Pto. Ayacucho, 99 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 14.

Family NOCTILIONIDAE

Noctilio albiventris Desmarest, 1818:15.

Lowlands of central and northern Venezuela. Netted (54 percent) or taken from roosts in hollow trees (45 percent) and rarely in rocks (1 percent); never far from streams (but 20 percent netted or found roosting in upland sites); in savanna or pasture (41 percent), swamp or marshes (20 percent), yards, croplands, and orchards (19 percent), evergreen forest (18 percent), and thorn forest (2 percent); 1-300 m; bs-T (306) and bh-T (229).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 to 46 km NE Pto. Páez, 76 m, (86); Pto. Páez to Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (47); San Rafael de Atamaica, 42 km SSE San Fernando de Apure, 100 m, (3). BOLÍVAR, Hato La Florida, 47 km ESE Caicara, 50 m, (2). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (12). GUÁRICO, Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (8). MIRANDA, 4 to 7 km E Río Chico, 1 m, (8). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (2). SUCRE, San Fernando, 16 km SE Cumaná, 300 m, (1). T. F. AMAZONAS, 20 to 28 km S Pto. Ayacucho, 135 m, (9); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (212). TRUJILLO, La Ceiba, 47 km WNW Valera, 29 m, (1); 25 km NW Valera, 90 m, (1). ZULIA, El Rosario, 42 km WNW Encontrados, 24 m, (15). CARABOBO and YARACUY, 10 to 19 km NW Urama, 25 m, (128). Total 535.

Noctilio leporinus Linnaeus, 1758:32.

Lowland localities throughout Venezuela. Netted (100 percent); over or near streams or in other moist areas (100 percent); in savannas, pastures, and marshes (53 percent), evergreen and deciduous forest (30 percent), and yards and orchards (17 percent); 1-181 m; bms-T (4), bs-T (51), bh-T (23), bmh-T (4), and bh-P (5).

Specimens collected: APURE, between Pto. Páez and Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (1). BOLÍVAR, Hato La Florida, 47 km ESE Caicara, 50 m, (1); Río Supamo, 50 km SE El Manteco, 150 m, (5). GUÁRICO, Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (2). MIRANDA, 1 to 7 km E and S Río Chico, 1 m, (5). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1). SUCRE, 21 km E Cumaná, 1 m, (4); Ensenada Cauranta, 9 km NE Güiria, 1 m, (3). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (4); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (10); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (1); El Rosario, 42 km WNW Encontrados, 24 m, (12). CARABOBO and YARACUY, 10 to 11 km NW Urama, 25 m, (37). Total 87.

Family MORMOOPIDAE

Pteronotus davyi Gray, 1838:500.

Lowlands of northern Venezuela. Netted (60 percent) and found roosting in caverns (38 percent) or in houses and rocks (2 percent); in dry (73 percent) or moist sites (27 percent); in thorn forest (39 percent), openings such as yards, orchards, croplands, and pastures (35 percent), and in evergreen forest (26 percent); 1-528 m; bms-T (86), bs-T (2), and bh-P (134).

Specimens collected: DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380 m, (1). FALCÓN, Península de Paraguaná, 7 km W Pueblo Nuevo, 120 m, (85). LARA, Caserio Boro, 10 km N El Tocuyo, 528 m, (1). SUCRE, Ensenada Cauranta, 9 km NE Güiria, 1 m, (1); Manacal, 26 km ESE Carúpano, 400 m, (1). YARACUY, Minas de Aroa, 20 km NW San Felipe, 380-400 m, (132); 10 km NW Urama, 25 m, (1). Total 222.

Pteronotus parnellii Gray, 1843:50.

Lowlands and low mountains throughout Venezuela except in most of the Llanos and in the extreme west. Caught in mist nets (90 percent) or found roosting in caverns (9 percent) and in tree holes (1 percent); over or near streams and in other moist areas (83 percent) or in dry places (17 percent); in evergreen forest (48 percent), deciduous and thorn forest (23 percent), openings such as yards, orchards, pastures, and croplands (19 percent), swamps (9 percent), and cloud forest (1 percent); 1-1,537 m (92 percent below 500 m); bms-T (28), bs-T (178), bh-T (138), bmh-T (24), bs-P (2), bh-P (123), bmh-P (11), and bh-MB (1).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 km NE Pto. Páez, 76 m, (5); 1 km W Pto. Páez, 76 m, (6). ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,081-1,100 m, (6). BARINAS, 2 km SW Altamira, 619 m, (1). BOLÍVAR, El Manaco, 56 to 59 km SE El Dorado, 150 m, (6); 5 km NNW Guasipati, 190 m, (64); Hato La Florida, 47 km ESE Caicara, 50 m, (45); Hato San José, 20 km W La Paragua, 306 m, (4); 21 km NE Icabarú, 750 m, (1); Km 125, 85 km SSE El Dorado, 882-1,032 m, (2); Los Patos, 28 km SE El Manteco, 150 m, (4); Río Supamo, 50 km SE El Manteco, 150 m, (3). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (2). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (3); Los Venados, 4 km NNW Caracas, 1,513 m, (1) FALCÓN, 14 to 16 km ENE Mirimire, 60-70 m, (6); Península de Paraguaná, 7 km W Pueblo Nuevo, 120 m, (7); Riecito, 30 km S Mirimire, 300 m, (1). GUÁRICO, Hda. Elvira, 10 km NE Altagracia, 630 m, (6). LARA, Caserio Boro, 10 to 13 km N and NW El Tocuyo, 518-900 m, (10). MIRANDA, Birongo to 4 km SW Birongo, 60-195 m, (13); Cueva Ricardo Zuloaga, nr. El Encantado, 15 km SE Caracas, 548 m, (4); Curupao, 5 km NNW Guarenas, 1,140-1,160 m, (4); 1 km E Río Chico, 1 m, (1); San Andrés, 16 km SSE Caracas, 950-1,144 m, (2). MONAGAS, San Agustín, 5 km NW Caripe, 1,165 m, (1). NUEVA ESPARTA, Isla Margarita, 3 km S La Asunción, 53-305 m, (13). SUCRE, Ensenada Cauranta, 9 to 12 km NE Güiria, 1-90 m, (27). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (6); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (18); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (8); 14 to 32 km S and SSE Pto. Ayacucho, 119-135 m, (6); Río Mavaca, 108 km SSE Esmeralda, 140 m, (60); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (34); Tamatama, Río Orinoco, 135 m, (3). TRUJILLO, 23 to 25 km N and NW Valera, 90-164 m, (3). YARACUY, Minas de Aroa, 20 km NW San Felipe, 380-400 m, (104). CARABOBO, FALCÓN, and YARACUY, 6 to 19 km NW and N Urama, 25-60 m, (15). Total 505.

Pteronotus personatus Wagner, 1843a:367.

Bolívar and base of Península de Falcón. Netted over and near streams and in dry areas; in evergreen forest, pasture, and in a yard; 25-395 m; bs-T (1) and bh-P (3).

Specimens collected: BOLÍVAR, Los Patos, 25 km SE El Manteco, 150 m, (1). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395 m, (2); 10 km NW Urama, 25 m, (1). Total 4.

Pteronotus suapurensis J. A. Allen, 1904:229.

Northwestern Venezuela. Caught in mist nets (100 percent); mostly in dry situations (94 percent) and only rarely in moist places (6 percent); in yards (90 percent), evergreen forest (8 percent), and deciduous forest (2 percent); 164-400 m; bh-T (2) and bh-P (49).

Specimens collected: TRUJILLO, 19 km N Valera, 164 m, (2). YARACUY, Minas de Aroa, 19 to 30 km NW San Felipe, 395-400 m, (49). Total 51.

Mormoops megalophylla Peters, 1864:381.

Widely scattered localities in Bolívar and in northern Venezuela. Found roosting in caverns (82 percent) or caught in mist nets (18 percent); in moist areas and over streams (68 percent) or in dry sites (32 percent); in deciduous and thorn forest (83 percent), orchards and yards (16 percent), and evergreen forest (1 percent); 1-395 m; bms-T (25), bs-T (59), and bh-P (4).

Specimens collected: BOLÍVAR, Hato San José, 20 km W La Paragua, 306 m, (1). FALCÓN, Península de Paraguaná, 7 km W Pueblo Nuevo, 120 m, (25). SUCRE, Ensenada Cauranta, 9 to 11 km NE Güiria, 1-90 m, (59). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395 m, (3). Total 88.

Family PHYLLOSTOMIDAE

Subfamily PHYLLOSTOMINAE

Micronycteris brachyotis Dobson, 1879:880.

Widely scattered localities in northern and southern Venezuela. Netted (67 percent) and found roosting in a hollow tree (33 percent); in moist (67 percent) or dry situations (33 percent); in evergreen forest (67 percent) and in a settlement in evergreen forest (33 percent); 25-150 m; bh-T (2) and bh-P (1).

Specimens collected: BOLÍVAR, Los Patos, 25 km SE El Manteco, 150 m, (1). FALCÓN, 19 km NW Urama, 25 m, (1). T. F. AMAZONAS, Tamatama, Río Orinoco, 135 m, (1). Total 3.

Micronycteris hirsuta Peters, 1869:396.

Widely scattered lowland localities in southern and western Venezuela. Netted (100 percent); near streams and other moist areas (80 percent) or in dry situations (20 percent); in evergreen forest (60 percent) and in yards (40 percent); 24-155 m; bh-T (4) and bmh-T (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). FALCÓN, 19 km NW Urama, 25 m, (1). T. F. AMAZONAS, Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (1). Total 5.

Micronycteris megalotis Gray, 1842:257.

At lower elevations throughout Venezuela. Mist netted (55 percent), or found roosting in hollow trees and logs (24 percent), caverns, crevices, culverts, and rocks (15 percent), or houses (6 percent); near streams and in other moist areas (70 percent) or in dry habitats (30 percent); in evergreen forest (54 percent), openings such as pastures, yards, and orchards (25 percent), thorn and deciduous forest (20 percent), and swamp (1 percent); 2-794 m; me-T (3), bms-T (8), bs-T (23), bh-T (44), bmh-T (3), bh-P (6), and bmh-P (14).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 to 46 km NE Pto. Páez, 76 m, (10); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1); Río Cinaruco, 65 km NW Pto. Páez, 76 m, (1). BARINAS, Altamira to 2 km S and SW Altamira, 609-794 m, (14). BOLÍVAR, Hato San José, 20 km W La Paragua, 306-324 m, (2). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (1); Capatárida, 40 m, (3); 6 to 11 km ENE Mirimire, 230-360 m, (5); Riecito, 30 km S Mirimire, 300 m, (3). LARA, Caserio Boro, 10 km N El Tocuyo, 518-537 m, (5). SUCRE, 21 km E Cumaná, 15 m, (3); Manacal, 26 km ESE Carúpano, 200 m, (1). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (10); 20 km S Pto. Ayacucho, 135 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (5); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (23). TRUJILLO, 19 to 26 km N Valera, 131-164 m, (6). YARACUY, 10 km NW Urama, 25 m, (2). ZULIA, El Rosario, 51 km WNW Encontrados, 37 m, (3). Total 101.

Micronycteris microtis Miller, 1898:328.

Widespread in southern Venezuela and at scattered localities in northern Venezuela. Found in roosts in hollow trees and logs (40 percent) and under rocks (4 percent), or mist netted (56 percent); near streams and other moist areas (76 percent) or in dry sites (24 percent); in evergreen forest (74 percent), in pastures and yards (18 percent), and in deciduous and thorn forest (8 percent); 15-2,092 m (82 percent below 500 m); me-T (1), bms-T (1), bs-T (8), bh-T (18), bmh-T (8), bh-P (1), bmh-P (1), and bh-MB (7).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 to 46 km NE Pto. Páez, 76 m, (2); Pto. Páez, 75 m, (2). BOLÍVAR, 21 km NE Icabarú, 851 m, (1). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,400-1,524 m, (6); Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,092 m, (1). FALCÓN, Capatárida, 40 m, (1). SUCRE, 21 km E Cumaná, 15 m, (1). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (2); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (6); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (13); 28 km S Pto. Ayacucho, 135 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (1). ZULIA, nr. Cerro Azul, 33 to 39 km NW La Paz, 80 m, (3). Total 45.

Micronycteris minuta Gervais, 1856:50.

At lower elevations throughout Venezuela. Found in roosts in hollow trees (44 percent) or caught in mist nets (56 percent); near streams and in other moist areas (92 percent) or in dry places (8 percent); in openings such as orchards, pastures, croplands, and yards (49 percent, in order of decreasing frequency), in evergreen forest (24 percent), and in deciduous and thorn forest (17 percent), swamps (8 percent), and cloud forest (2 percent); 1-1,144 m (92 percent below 500 m); bms-T (4), bs-T (41), bh-T (16), bmh-T (1), bh-P (3), and bmh-P (1).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (1); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (1). BARINAS, 2 km SW Altamira, 620 m, (1). BOLÍVAR, Los Patos, 28 km SE El Manteco, 150 m, (2). GUÁRICO, Est. Biol. de los Llanos, 14 km SE Calabozo, 100 m, (1). LARA, Caserío Boro, 10 km N El Tocuyo, 518-528 m, (2). MIRANDA, nr. El Encantado, 13 km SE Caracas, 570 m, (1); 7 km E Río Chico, 1 m, (4); San Andrés, 16 km SSE Caracas, 1,144 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (2). SUCRE, 21 km E Cumaná, 1 m, (2). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); 65 km SSW Pto. Ayacucho, 161 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (6); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (5). TRUJILLO, 19 to 26 km N and NW Valera, 90-164 m, (10). ZULIA, nr. Cerro Azul, 33 to 35 km NW La Paz, 75-80 m, (24). Total 66.

Micronycteris nicefori Sanborn, 1949:230.

At widely scattered localities throughout the humid lowlands of Venezuela. Caught in roosts in hollow trees (93 percent) and in mist nets (7 percent); in dry uplands (94 percent) or near streams and other moist areas (6 percent); in evergreen forest (98 percent) and in yards and orchards (2 percent); 24-460 m; bh-T (11), bmh-T (1), bh-P (179), and bmh-P (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). BOLÍVAR, Los Patos, 25 km SE El Manteco, 150-350 m, (179). MIRANDA, Birongo, 60 m, (1). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (3); 25 km S Pto. Ayacucho, 114 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (2). TRUJILLO, 19 km N Valera, 164 m, (1). Total 192.

Micronycteris schmidtorum Sanborn, 1935:81.

In the lowlands of northwestern Venezuela and T. F. Amazonas. Found roosting in tree holes (83 percent) and caught in mist nets (17 percent); near streams (72 percent) or in dry areas (28 percent); in evergreen forest (39 percent), thorn forest (28 percent), swamp or marsh (22 percent), or in pastures and orchards (11 percent); 50-155 m; me-T (1), bms-T (4), bs-T (1), bh-T (10), and bmh-T (2).

Specimens collected: FALCÓN, Capatárida to 16 km SSW Capatárida, 50-75 m, (5). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (9). ZULIA, nr. Cerro Azul, 40 km NW La Paz, 75 m, (1). Total 18.

Glyphonycteris sylvestris Thomas, 1896:302.

T. F. Amazonas. Caught in bat traps (67 percent) and found roosting in a hollow tree (33 percent); near streams in evergreen forest (100 percent); 130-155 m; bh-T (3).

Specimens collected: T. F. AMAZONAS, Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 3.

Lonchorhina aurita Tomes, 1863:83.

Northwestern Venezuela and Bolívar. Netted (90 percent) or found roosting in caves (9 percent) and in a culvert (1 percent); near streams and in other moist areas (98 percent) or rarely in dry sites (2 percent); in evergreen forest (67 percent), deciduous forest (23 percent), yards, orchards, croplands, and pastures (9 percent), and cloud forest (1 percent); 25-1,537 m (96 percent below 1,000 m); bs-T (59), bh-T (35), bs-P (1), bh-P (32), and bmh-P (4).

Specimens collected: BARINAS, 7 km NNE Altamira, 1,070 m, (1). BOLÍVAR, Hato San José, 20 km W La Paragua, 300 m, (1). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (3); 3 to 6 km SE and W Montalbán, 562-900 m, (28); 10 km NW Urama, 25 m, (1). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (3). FALCÓN, Riecito, 30 km S Mirimire, 300 m, (35). MIRANDA, Birongo to 4 km SW Birongo, 60-195 m, (7). TRUJILLO, 19 to 26 km N and NNW Valera, 90-164 m, (37). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-400 m, (2). ZULIA, El Rosario, 65 km WNW Encontrados, 95 m, (1); Kasmera, 21 km SW Machiques, 270 m, (12). Total 131.

Remarks: Specimens from the folowing localities are tentatively referred to *Lonchorhina aurita*: T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1).

Lonchorhina orinocensis Linares and Ojasti, 1971:2.

Near the Río Orinoco, in Apure and northern T. F. Amazonas. Caught emerging from hot dry roosts in large rocks in prairie (96 percent) and netted in moist places in yards, evergreen forest, and deciduous forest (4 percent); 76-135 m; bs-T (244) and bh-T (8).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 km NE Pto. Páez, 76 m, (225); Pto. Páez, 76 m, (17). T. F. AMAZONAS, 14 to 30 km S and SSE Pto. Ayacucho, 114-135 m, (10). Total 252.

Macrophyllum macrophyllum Schinz, 1821:163.

Widespread localities in Venezuelan lowlands. Caught in mist nets (62 percent) and found roosting in culverts (38 percent); near streams and in other moist areas (79 percent) or in dry situations (21 percent); in evergreen forest (84 percent), grasslands (14 percent), and deciduous forest (2 percent); 37-181 m; bs-T (18), bh-T (29), bmh-T (1), and bh-P (2).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 to 46 km NE Pto. Páez, 76 m, (5). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (2); Río Supamo, 50 km SE El Manteco, 150 m, (2). GUÁRICO, Embalse de Guárico, 10 km N Calabozo, 100 m, (12); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (4); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2). ZULIA, El Rosario, 51 to 61 km WNW Encontrados, 37-76 m, (19). Total 50.

Tonatia bidens Spix, 1823:65.

Throughout the humid lowlands of Venezuela. Caught in mist nets (100 percent); over and near streams (32 percent) and in other moist sites (52 percent), or occasionally in dry situations (16 percent); in evergreen forest (79 percent), and in swamps, pastures, orchards, and yards (21 percent); 24-155 m; bs-T (2), bh-T (16), and bmh-T (1).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (1); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Hato La Florida, 47 km SE Caicara, 50 m, (1). FALCÓN, 19 km NW Urama, 25 m, (8). MIRANDA, Birongo, 60 m, (1). T. F. AMAZONAS, Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). ZULIA, El Rosario, 48 km WNW Encontrados, 54 m, (1). Total 19.

Tonatia brasiliensis Peters, 1866c:674.

Widespread in humid lowlands. Caught in mist nets (98 percent) and by hand in a house (2 percent); over and near streams (34 percent) and in other moist areas (48 percent) or in dry situations (18 percent); in evergreen forest (56 percent) and in openings such as orchards, yards, pastures, and croplands (40 percent), and rarely in swamps (2 percent) and deciduous forest (2 percent); 18-794 m (94 percent below 500 m); bs-T (6), bh-T (34), bmh-T (8), and bmh-P (3).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (8). BARINAS, Altamira to 2 km SW Altamira, 619-794 m, (3). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1). T. F. AMAZONAS, 25 to 65 km S and SSW Pto. Ayacucho, 114-161 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (12). TRUJILLO, 19 km N Valera, 164 m, (1). ZULIA, El Rosario, 39 km WNW Encontrados, 37 m, (1). FALCÓN and YARACUY, 11 to 19 km NW Urama, 25 m, (22). Total 51.

Tonatia carrikeri J. A. Allen, 1910:147.

T. F. Amazonas. Caught in mist nets set near streams in an evergreen forest and in an orchard; 140-155 m; bh-T (2).

Specimens collected: T. F. AMAZONAS, Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 2.

Tonatia silvicola d'Orbigny, 1836: pl. 6 (description, d'Orbigny and Gervais, 1847:11).

Humid lowlands of western and southern Venezuela. Mist netted (71 percent) or found roosting in termite nests in trees (29 percent); near streams (58 percent) and in other moist areas (36 percent), or in dry situations (6 percent); in evergreen forest (74 percent) and openings such as pastures, orchards, and yards (13 percent), and occasionally in deciduous forest (13 percent); 25-460 m; bs-T (9), bh-T (26), bmh-T (5), bh-P (1), and bmh-P (1).

Specimens collected: BOLÍVAR, Los Patos, 28 km SE El Manteco, 150 m, (1). FALCÓN, 19 km NW Urama, 25 m, (5). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (5); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (14); 25 to 65 km S and SSW Pto. Ayacucho, 114-161 m, (3); Río Mavaca, 108 km SSE Esmeralda, 140 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (3). TRUJILLO, 25 km NW Valera, 90 m, (7). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (1). Total 42.

Mimon crenulatum E. Geoffroy, 1810:183.

Scattered lowland localities throughout Venezuela. Caught in mist nets (94 percent) or found roosting in hollow trees (6 percent); in moist areas and near streams (82 percent) or in dry places (18 percent); in evergreen forest (73 percent), openings such as pastures, croplands, orchards, and yards (17 percent), and occasionally in thorn, swamp, and deciduous forest (10 percent); 1-580 m; bms-T (1), bs-T (11), bh-T (51), bmh-T (6), me-P (2), and bh-P (1).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 to 46 km NE Pto. Páez, 76 m, (5); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (6). BOLÍVAR, Los Patos, 28 km SE El Manteco, 150 m, (1). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (1). LARA, Caserio Boro, 10 km NE El Tocuyo, 580 m, (2). MIRANDA, 7 km E Río Chico, 1 m, (2). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1). SUCRE, 21 km E Cumaná, 1 m, (1). T. F. AMAZONAS, Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). TRUJILLO, 23 km N Valera, 164 m, (2). ZULIA, El Rosario, 39 km WNW Encontrados, 37 m, (2). CARABOBO and FALCÓN, 6 to 19 km NW and N Urama, 25-60 m, (45). Total 72.

Phyllostomus discolor Wagner, 1843a:366.

Forested lowlands throughout Venezuela. Caught in mist nets (99.7 percent) and found roosting in a cave (0.3 percent); near streams and other moist areas (58 percent) and in dry sites (42 percent); in orchards, yards, croplands, and pastures (43 percent), in evergreen (23 percent), thorn (22 percent), deciduous (10 percent), and cloud and swamp forest (2 percent); 1-1,165 m (93 percent below 500 m); me-T (61), bms-T (12), bs-T (115), bh-T (102), bs-P (21), bh-P (10), and bmh-P (6).

Specimens collected: BARINAS, 2 km SW Altamira, 611-620 m, (6). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (3); Hato San José, 20 km W La Paragua, 306 m, (2). CARABOBO, 2 km SE Montalbán, 598 m, (13). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (3). FALCÓN, Capatárida, 40-55 m, (61); 16 km ENE Mirimire, 70 m, (4); Río Socopito, 80 km NW Carora, 470-480 m, (13). GUÁRICO, Hda. Elvira, 10 km NE Altagracia, 630 m, (2); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (6). MIRANDA, Birongo, 60 m, (1); 1 to 7 km E and S Río Chico, 1 m, (8). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (18); San Agustín, 5 km NW Caripe, 1,160-1,165 m, (3). NUEVA ESPARTA, Isla Margarita, 3 to 10 km S and WSW La Asunción, 47-53 m, (12). SUCRE, Ensenada Cuaranta, 9 km NE Güiria, 1-7 m, (22); Manacal, 26 km ESE Carúpano, 175-380 m, (10). T. F. AMAZONAS, 25 to 33 km S Pto. Ayacucho, 114-195 m, (8); Río Mavaca, 108 km SSE Esmeralda, 140 m, (15); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (6). TRUJILLO, 23 to 25 km N and NW Valera, 90-164 m, (32). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (7); El Rosario, 39 to 63 km WNW Encontrados, 37-125 m, (54); Kasmera, 21 km SW Machiques, 270 m, (14). CARABOBO and FALCÓN, 6 to 19 km NW and N Urama, 25-60 m, (4). Total 327.

Phyllostomus elongatus E. Geoffroy, 1810:182.

Southern and central Venezuela. Caught in mist nets (74 percent) and found roosting in tree holes (25 percent) and in a culvert (1 percent); near streams and in other moist areas (85 percent) or occasionally in dry places (15 percent); in evergreen forest (72 percent), yards (20 percent), and pastures, croplands, orchards, and deciduous forest (8 percent); 18-350 m; bs-T (9), bh-T (94), bmh-T (1), and bh-P (13).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 km NE Pto. Páez, 76 m, (1); Río Cinaruco, 65 km NW Pto. Páez, 76 m, (1); San Rafael de Atamaica, 42 km SSE San Fernando de Apure, 100 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Hato San José, 20 km W La Paragua, 306 m, (1); Piedra Virgen, 70 km SSE El Dorado, 229 m, (1); Los Patos, 25 km SE El Manteco, 150-350 m, (10); Río Supamo, 50 km SE El Manteco, 150 m, (3). GUÁRICO, Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (2). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (3). T.F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (8); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (3); 25 to 33 km S Pto. Ayacucho, 114-195 m, (10); Río Mavaca, 108 km SSE Esmeralda, 140 m, (36); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (29); Tamatama, Río Orinoco, 135 m, (6). Total 117.

Phyllostomus hastatus Pallas, 1767:7.

Throughout Venezuela. Caught in mist nets (72 percent) or found roosting in hollow trees (18 percent), caves (6 percent), and houses (4 percent); near streams and in other moist areas (80 percent) or in dry places (20 percent); in openings such as yards, orchards, croplands, and pastures (62 percent), and in evergreen (21 percent), swamp (11 percent), and deciduous forest (6 percent); 1-1,394 m (94 percent below 500 m); bms-T (1), bs-T (83), bh-T (333), bmh-T (15), bs-P (15), bh-P (45), bmh-P (9), and bh-MB (3).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (15); Pto. Páez, 76 m, (1). BARINAS, Altamira, 620-794 m, (6). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (9); Hato La Florida, 47 km ESE Caicara, 50 m, (1); Icabarú to 45 km NE Icabarú, 473-851 m, (4); Los Patos, 28 km SE El Manteco, 150 m, (2). CARABOBO, Montalbán, 598-618 m, (11). DTO. FEDERAL, Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (3). FALCÓN, 16 km ENE Mirimire, 70 m, (1); Río Socopito, 80 km NW Carora, 480 m, (1). GUÁRICO, Est. Biol. de los Llanos, 14 km SE Calabozo, 100 m, (1). MIRANDA, Birongo, 60-160 m, (11); Curupao, 5 km NNW Guarenas, 1,140 m, (1); San Andrés, 16 km SSE Caracas, 950-1,144 m, (5). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (27); San Agustín, 3 to 5 km NW Caripe, 1,165-1,175 m, (2). SUCRE, 21 km E Cumaná, 1 m, (1); Ensenada Cauranta, 10 km NE Güiria, 90 m, (22); Manacal, 26 km ESE Carúpano, 175-380 m, (36); San Fernando, 16 km SE Cumaná, 300 m, (4). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (2). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (5); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (5); 25 to 33 km S Pto. Ayacucho, 114-195 m, (25); Río Mavaca, 108 km SSE Esmeralda, 104 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (255); Tamatama, Río Orinoco, 135 m, (4). TRUJILLO, 19 to 25 km N to NW Valera, 90-164 m, (10). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (1); El Rosario, 39 to 48 km WNW Encontrados, 37-54 m, (12). CARABOBO, FALCÓN, and YARACUY, 6 to 19 km NW and N Urama, 25-60 m, (16). GUÁRICO and MIRANDA, Parque Nac. Guatopo and Río Orituco, 10 to 21 km N and NW Altagracia, 470-630 m, (4). Total 504.

Phylloderma stenops Peters, 1865b:513.

Numerous lowland localities in southern Venezuela and scattered localities near the northern coast. Netted (100 percent); over and near streams and in other moist places (100 percent); in evergreen forest (44 percent), yards (26 percent), pastures, orchards, croplands, and marshes (23 percent), and thorn forest (7 percent); 1-306 m; bms-T (1), bs-T (8), bh-T (17), and bmh-T (2).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (1); Río Cinaruco, 48 km NW Pto. Páez, 76 m, (1). BOLÍVAR, Hato San José, 20 km W La Paragua, 300-306 m, (2). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (3); 16 km ENE Mirimire, 70 m, (1); 19 km NW Urama, 25 m, (1). SUCRE, 21 km E Cumaná, 1 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); 33 km S Pto. Ayacucho, 195 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (5); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (6); Tamatama, Río Orinoco, 135 m, (2). Total 28.

Trachops cirrhosus Spix, 1823:64.

Humid lowlands of southern, central, and western Venezuela. Caught in mist nets (90 percent) and found roosting in hollow trees (9 percent) and culverts (1 percent); usually near streams and in other moist areas (87 percent) but occasionally in dry sites (13 percent); in evergreen forest (74 percent), open areas such as savannas, yards, orchards, and croplands (22 percent), deciduous forest (3 percent), and swamps (1 percent); 24-1,032 m (99 percent below 500 m); bs-T (204), bh-T (148), bmh-T (1), bh-P (2), and bmh-P (7).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 to 46 km NE Pto. Páez, 76 m, (19); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (6); 5 km NNW Guasipati, 190 m, (1); Hato San José, 20 km W La Paragua, 300-306 m, (7); 45 km NE Icabarú, 851 m, (2); Km 125, 85 km SSE El Dorado, 761-1,032 m, (4); Río Supamo, 50 km SE El Manteco, 350 m, (2). FALCÓN, Riecito, 30 km S Mirimire, 300 m, (5). GUÁRICO Calabozo, 100 m, (4); Embalse de Guárico, 10 km N Calabozo, 100 m, (142); Est. Biol. de los Llanos, 14 km SE Calabozo, 100 m, (6); San José de Tiznados, 52 km NNW Calabozo, 150 m, (12). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 300 m, (1). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (5); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (3); 14 to 33 km S and SSE Pto. Ayacucho, 114-195 m, (5); Río Mavaca, 108 km SSE Esmeralda, 140 m, (83); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (29). TRUJILLO, 23 to 25 km NW and NNW Valera, 90 m, (4). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (3). CARABOBO, FALCÓN, and YARACUY, 6 to 19 km NW and N Urama, 25-60 m, (18). Total 362.

Chrotopterus auritus Peters, 1856:415.

Forested lowlands of southern and northwestern Venezuela. Caught in mist nets (89 percent) and found in a cavern (11 percent); usually near streams or other moist areas (89 percent) but occasionally in dry places (11 percent); in evergreen forest (84 percent), openings such as fields and yards (11 percent), and deciduous forest (5 percent); 25-851 m (97 percent below 500 m); bs-T (3), bh-T (26), bmh-T (2), bh-P (5), and bmh-P (1).

Specimens collected: BOLÍVAR, El Manaco, 56 km SE El Dorado, 150 m, (1); 45 km NE Icabarú, 851 m, (1); Río Supamo, 50 km SE El Manteco, 350 m, (1). FALCÓN, 12 km ENE Mirimire, 220 m, (4). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); 20 km S Pto. Ayacucho, 135 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (13); San Juan Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (3). TRUJILLO, 19 to 25 km N and NW Valera, 90-164 m, (2). ZULIA, Kasmera, 21 km SW Machiques, 270 m, (1). CARABOBO, FALCÓN, and YARACUY, 10 to 19 km NW Urama, 25 m, (7). Total 37.

Vampyrum spectrum Linnaeus, 1758:31.

Scattered lowland and foothill localities in northern and southern Venezuela. Caught in mist nets (100 percent); beside streams and in other moist areas (100 percent); in evergreen forest (40 percent), yards (40 percent), and swamps (20 percent); 1-1,032 m; bs-T (1), bh-T (3), and bmh-P (1).

Specimens collected: BOLÍVAR, Km 125, 85 km SSE El Dorado, 1,032 m, (1). MIRANDA, 7 km E Río Chico, 1 m, (1). T.F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (3). Total 5.

Subfamily GLOSSOPHAGINAE

Glossophaga longirostris Miller, 1898:330.

Arid lowlands of northern Venezuela and Llanos of central Venezuela. Mist netted (84 percent) or found roosting in houses (10 percent), caverns, rocks, and crevices (4 percent), and in hollow trees (2 percent); mostly in dry situations (65 percent) but often near streams and other moist areas (35 percent); in thorn forest (49 percent), in openings such as savannas and pastures, yards, orchards, and croplands (43 percent, in descending order of frequency), and in swamps and marshes, deciduous, evergreen, and cloud forest (8 percent, in descending order of frequency); 1-650 m (98 percent below 500 m); me-T (288), bms-T (142), bs-T (363), bh-T (27), me-P (4), bs-P (8), and bmh-P (5) (86 percent in dry zones).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 to 46 km NE Pto. Páez, 76 m, (116); Pto. Páez to Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (32); Río Cinaruco, 48 km NW Pto. Páez, 76 m, (1); San Rafael de Atamaica, 42 km SSE San Fernando de Apure, 100 m, (6). BOLÍVAR, Hato La Florida, 44 to 47 km ESE Caicara, 43-50 m, (10); Hato San José, 20 km W La Paragua, 300-306 m, (8). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (15); Capatárida, 40-75 m, (173); 20 km NNE Mirimire, 1-5 m, (20); Península de Paraguaná, 15 to 25 km SW and SSW Pueblo Nuevo, 13-650 m, (36); Río Socopito, 80 km NW Carora, 480 m, (1). GUÁRICO, Calabozo, 100 m, (15); Embalse de Guárico, 10 km N Calabozo, 100 m, (20); Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (2); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (2); San José de Tiznados, 52 km NNW Calabozo, 150 m, (69). LARA, Caserio Boro, 10 to 47 km N and NE El Tocuyo, 521-592 m, (15). MIRANDA, 1 to 7 km N, E, and S Río Chico, 1 m, (33). NUEVA ESPARTA, Isla Margarita, 1-305 m, (80). SUCRE, 16 to 21 km E Cumaná, 1-30 m, (33); Ensenada Cauranta, 9 km NE Güiria, 4-7 m, (4). T. F. AMAZONAS, 14 to 30 km SSE, S, and SSW Pto. Ayacucho, 114-161 m, (18); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (16). TRUJILLO, 23 to 26 km NW Valera, 90-164 m, (22). GUAJIRA and ZULIA, nr. Cojoro, 35 to 44 km NNE Paraguaipoa, 5-155 m, (90). Total 837.

Glossophaga soricina Pallas, 1766:48.

Lowlands throughout Venezuela. Caught in mist nets (95 percent) or found roosting in houses (3 percent), caverns (1 percent), and hollow trees and logs (1 percent); mostly in moist situations (83 percent) and only occasionally in dry areas (17 percent); in openings such as yards, orchards, savannas, pastures, and croplands (60 percent, in descending order of frequency), in evergreen forest (31 percent), and in thorn forest, swamp, and deciduous forest (9 percent, in descending order of frequency); 1-1,560 m (85 percent below 500 m, 97 percent below 1,000 m); me-T (5), bms-T (19), bs-T (328), bh-T (264), bmh-T (21), me-P (2), bs-P (5), bh-P (78), bmh-P (140), and bh-MB (4) (61 percent in humid zones).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (8); Pto. Páez, 76 m, (5). BARINAS, Altamira, 609-1,070 m, (63). BOLÍVAR, El Manaco, 56 to 59 km SE El Dorado, 150 m, (56); 5 km NNW Guasipati, 190 m, (1); Hato La Florida, 47 km ESE Caicara, 50 m, (1); Hato San José, 20 km W La Paragua, 300-306 m, (21); Icabarú and 23 to 45 km NE Icabarú, 473-851 m, (11); Km 125, 85 km SSE El Dorado, 916-1,165 m, (15); Río Supamo, 50 km SE El Manteco, 150 m, (3). CARABOBO, Montalbán, 598-900 m, (13). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (1); Los Venados, 4 km NNW Caracas, 1,498-1,560 m, (4). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (2); Capatárida, 40-55 m, (5); 13 to 20 km NNE and ENE Mirimire, 5-270 m, (36); Riecito, 30 km S Mirimire, 300 m, (25); Río Socopito, 80 km NW Carora, 470-480 m, (2). GUÁRICO, Embalse de Guárico, 10 km N Calabozo, 100 m, (1); Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (11); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (1). LARA, Caserio Boro, 10 km NE El Tocuyo, 580 m, (2). MIRANDA, Birongo, 60 m, (15); nr. El Encantado, 15 km SE Caracas, 548 m, (1); Parque Nac. Guatopo, 15 to 21 km NW Altagracia, 630-650 m, (12); 1 to 10 km N, E, and S Río Chico, 1 m, (90); San Andrés, 16 km SSE Caracas, 1144 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (4); San Agustín, 3 to 5 km NW Caripe, 175-1,175 m, (4). NUEVA ESPARTA, Isla Margarita, 10 km WSW La Asunción, 47 m, (2). SUCRE, 16 to 21 km E Cumaná, 1-30 m, (15); Ensenada Cuaranta, 9 to 12 km NE Güiria, 1-100 m, (59); Manacal, 26 km ESE Carúpano, 300-366 m, (2). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (50). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (13); 14 to 65 km SSE to SSW Pto. Ayacucho, 114-195 m, (47); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (126); Tamatama, Río Orinoco, 135 m, (10). TRUJILLO, 19 to 25 km N to NW Valera, 90-164 m, (15). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-400 m, (22). ZULIA, nr. Cerro Azul, 33 to 35 km NW La Paz, 75-80 m, (8); El Rosario, 39 to 51 km WNW Encontrados, 37-54 m, (13); Kasmera, 21 km SW Machiques, 270 m, (12); Novito, 19 km WSW Machiques, 1,135 m, (3). CARABOBO, FALCÓN, and YARACUY, 2.5 to 19 km NW and ENE Urama, 25 m, (55). Total 866.

Glossophaga sp. ?

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 km NE Pto. Páez, 76 m, (2). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (1). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 4.

Lionycteris spurrelli Thomas, 1913:271.

Southern Venezuela. Caught in mist nets (63 percent) or found roosting in caves and crevices (37 percent); usually near streams and in other moist areas (99 percent) but also on a ridge-top far from water (1 percent); in evergreen forest (73 percent), yards (12 percent), orchards (12 percent), and savanna (3 percent); 135-1,400 m; bs-T (6), bh-T (76), bmh-T (2), bh-P (66), bmh-P (20), bp-P (1), and bp-MB (4).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (43); 13 to 23 km NE Icabarú, 658-851 m, (66); Km 125, 85 km SSE El Dorado, 602-1,165 m, (20). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2); Cabacera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400 m, (4); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 700 m, (1); 32 to 65 km S and SSW Pto. Ayacucho, 135-161 m, (7); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (18); Tamatama, Río Orinoco, 135 m, (14). Total 175.

Lonchophylla robusta Miller, 1912:23.

Eastern slopes and foothills of the Andes and Sierra de Perijá. Caught in mist nets (100 percent); near streams and other moist areas (70 percent) or in dry sites (30 percent); in evergreen forest (89 percent) or orchards (11 percent); 75-1,135 m; bs-T (2), bh-T (3), and bmh-P (21).

Specimens collected: BARINAS, nr. Altamira, 609-1,070 m, (20). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (2); Kasmera, 21 km SW Machiques, 270 m, (3); Novito, 19 km WSW Machiques, 1,135 m, (1). Total 26.

Lonchophylla thomasi J. A. Allen, 1904:230.

Bolívar and T. F. Amazonas. Caught in mist nets (86 percent) and found roosting in hollow trees (14 percent); near streams and in other moist areas (86 percent) or in dry areas (14 percent); in evergreen forest (52 percent) and in forest openings such as yards and orchards (48 percent); 114-851 m; bh-T (17), bh-P (3), and bmh-P (1).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); 45 km NE Icabarú, 851 m, (1); Río Supamo, 50 km SE El Manteco, 350 m, (3). T. F. AMAZONAS, Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (2); 25 to 32 km S Pto. Ayacucho, 114-135 m, (6); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (6); Tamatama, Río Orinoco, 135 m, (2). Total 21.

Anoura caudifer E. Geoffroy, 1818:418.

Mountainous portions of Venezuela. Mist netted (95 percent) and found roosting in rocks (4 percent) and in a culvert (1 percent); usually near streams or in other moist areas (87 percent) but occasionally in dry sites (13 percent); in evergreen forest (86 percent) and openings such as orchards and yards (14 percent); 60-1,700 m (89 percent between 500 and 1,500 m); bh-T (2), bmh-T (2), bh-P (14), bmh-P (93), bp-P (2), bh-MB (2), and bp-MB (5).

Specimens collected: BARINAS, Altamira to 2 km SW and 7 km NNE Altamira, 600-1,070 m, (43). BOLÍVAR, 45 km NE Icabarú, 851 m, (2); Km 125, 85 km SSE El Dorado, 761-1,165 m, (42). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (6); 9 km NE Montalbán, 752 m, (1). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,498 m, (2). MIRANDA, Birongo, 60 m, (2); Curupao, 5 km NNW Guarenas, 1,140-1,180 m, (8); San Andrés, 16 km SSE Caracas, 950 m, (3). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2); Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,200-1,400 m, (4); Cabecera del Caño Negro, Cerro Duida, 32 km NW Esmeralda, 1,700 m, (1); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 700-800 m, (2). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-400 m, (2). Total 120.

Anoura cultrata Handley, 1960:463.

Andes and Sierra de la Costa. Taken in a cave in evergreen forest and in a mist net in cloud forest; 195-1,870 m; bh-T (6) and bmh-MB (1).

Specimens collected: MÉRIDA, La Carbonera, 6 km SE La Azulita, 1,870 m, (1). MIRANDA, Cueva Walter Dupouy, 4 km SW Birongo, 195 m, (6). Total 7.

Anoura geoffroyi Gray, 1838:490.

Forested portions of Venezuela. Mist netted (97 percent) and found roosting in caves (3 percent); usually near streams or other moist areas (87 percent) but occasionally in dry places (13 percent); in evergreen forest (64 percent), openings such as orchards, croplands, and yards (32 percent), and cloud (3 percent) and deciduous forest (1 percent); 7-2,550 m (91 percent below 1,500 m); bs-T (46), bh-T (23), bs-P (3), bh-P (31), bmh-P (53), bh-MB (7), bmh-MB (1), bp-MB (22), and bp-M (4.)

Specimens collected: BARINAS, Altamira to 2 km SW Altamira, 609-794 m, (4). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (17); Hato San José, 20 km W La Paragua, 300-306 m, (4); 21 km NE Icabarú, 851 m, (5); Km 125, 85 km SSE El Dorado, 761-1,165 m, (46). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (3); Montalbán to 2 km S Montalbán, 598-1,091 m, (3). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,524-1,581 m, (5); Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,181-2,240 m, (2). FALCÓN, 14 to 16 km ENE Mirimire, 60-70 m, (24). GUÁRICO, Hda. Elvira, 10 km NE Altagracia, 630 m, (2). MÉRIDA, La Carbonera, 12 km SE La Azulita, 2,190 m, (1); 6 km ESE Tabay, 2,550 m, (4). MIRANDA, Birongo, 60 m, (1); Curupao, 5 km NNW Guarenas, 1,160-1,180 m, (2). MONAGAS, San Agustín, 3 to 5 km NW Caripe, 1,160-1,345 m, (20). SUCRE, Ensenada Cuaranta, 9 km NE Güiria, 7 m, (15); Manacal, 26 km ESE Carúpano, 366 m, (1). T. F. AMAZONAS, Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,200-1,400 m, (18); Cabecera del Caño Negro, Cerro Duida, 32 km NW Esmeralda, 1,700 m, (4); 14 to 65 km S, SSE, and SSW Pto. Ayacucho, 119-161 m, (6); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2). ZULIA, Kasmera, 21 km SW Machiques, 270 m, (1). Total 190.

Anoura sp. A.

Forested portions of Venezuela. Caught in mist nets (100 percent); near streams and in other moist areas (93 percent) or in dry places (7 percent); in evergreen forest (71 percent), openings such as yards and orchards (28 percent), and thorn forest (1 percent); 50-2,240 m (81 percent below 1,500 m); bs-T (3), bh-T (25), me-P (1), bh-P (2), bmh-P (44), and bh-MB (16).

Specimens collected: BARINAS, Altamira, 794 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (10); Hato La Florida, 47 km ESE Caicara, 50 m, (3); Km 125, 85 km SSE El Dorado, 1,032-1,165 m, (38). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (3). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,465-1,524 m, (4); Pico Ávila, nr. Hotel Humboldt and Boca de Tigre, 5 km NNE and 6 km NNW Caracas, 2,092-2,240 m, (12). LARA, La Concordia, 47 km NE El Tocuyo, 592 m, (1). SUCRE, Manacal, 26 km ESE Carúpano, 366-380 m, (2). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (15). ZULIA, Novito, 19 km WSW Machiques, 1,135 m, (2). Total 91.

Remarks: For notes on the systematics and nomenclature of this species, see Handley (in press).

Choeroniscus godmani Thomas, 1903:288.

Bolívar (13) and Falcón (1). Caught in mist nets (100 percent); near streams or other moist areas (100 percent); in evergreen forest (71 percent), orchards (21 percent), and marshes (7 percent); 2-350 m; bs-T (1), bh-T (10), and bh-P (3).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (10); Río Supamo, 50 km SE El Manteco, 350 m, (3). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (1). Total 14.

Choeroniscus minor Peters, 1868:366.

Bolívar. Netted near streams and other moist areas in evergreen forest and in an orchard in a forest opening; 150-1,032 m; bh-T (1), bh-P (1), and bmh-P (1).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Km 125, 85 km SSE El Dorado, 1,032 m, (1); Río Supamo, 50 km SE El Manteco, 350 m, (1). Total 3.

Choeroniscus sp. ?

Specimen collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1). Total 1.

Leptonycteris curasoae Miller, 1900a:126.

Arid portions of northern Venezuela. Found roosting in caverns (67 percent) and houses (1 percent) or caught in mist nets (32 percent); usually in dry situations (71 percent) but sometimes over or beside streams and ponds (29 percent); in thorn forest (99 percent) and openings such as yards and orchards (1 percent); 1-900 m; me-T (77), bms-T (248), me-P (2), and bs-P (438).

Specimens collected: FALCÓN, Capatárida, 40-55 m, (3); Península de Paraguaná, 7 to 25 km SW and W Pueblo Nuevo, 13-120 m, (109). LARA, Caserio Boro, 10 to 14 km N and NW El Tocuyo, 528-900 m, (591); La Concordia, 47 km NE El Tocuyo, 592 m, (2). NUEVA ESPARTA, Isla Margarita, 3 km S and NE La Asunción, 53-305 m, (9). SUCRE, 16 km E Cumaná, 1 m, (3). GUAJIRA and ZU-

LIA, nr. Cojoro, 35 to 37 km NNE Paraguaipoa, 5-15 m, (48). Total 765.

Lichonycteris degener Miller, 1931:411.

Bolívar. Netted in moist evergreen forest; 150 m; bh-T (1).

Specimen collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1). Total 1.

Scleronycteris ega Thomas, 1912:405.

T. F. Amazonas. Netted in a yard near a stream in evergreen forest; 135 m; bh-T (1).

Specimen collected: T.F. AMAZONAS, Tamatama, Río Orinoco, 135 m, (1). Total 1.

Subfamily CAROLLIINAE

Carollia brevicauda Schinz, 1821:164.

Mostly at medium elevations throughout the humid portions of Venezuela. Caught in mist nets (88 percent) or found roosting in rocks (7 percent), culverts (2 percent), caverns (1 percent), hollow trees (1 percent), and in houses, banana leaves, tree roots, and under a bridge (1 percent); near streams and other moist areas (91 percent) or rarely in dry sites (9 percent); in evergreen forest (82 percent), openings such as pastures, croplands, orchards, and yards (15 percent), and cloud (2 percent) and deciduous forest (1 percent); 24-2,147 m (81 percent between 500 and 1,500 m); bs-T (8), bh-T (21), bmh-T (19), bs-P (8), bh-P (126), bmh-P (285), bp-P (3), bh-MB (87), bmh-MB (5) and bp-MB (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (7). ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,100 m, (5). BARINAS, 2 to 7 km SW and NNE Altamira, 600-1,070 m, (177). BOLÍVAR, El Manaco, 56 km SE El Dorado, 150 m, (1); 23 to 45 km NE Icabarú, 824-851 m, (15); Km 125, 70 to 85 km SSE El Dorado, 761-1,165 m, (32). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (56); nr. Montalbán, 598-1,007 m, (31). DTO. FEDERAL, Alto Ño León, 31 km WSW Caracas, 1,750 m, (1); Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (13); Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (11); Los Venados, 4 km NNW Caracas, 1,400-1,559 m, (64); Pico Ávila, 5 km NNE Caracas, 2,147 m, (1). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260 m, (3); Río Socopito, 80 km NW Carora, 470-480 m, (2). GUÁRICO, Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (2); Hda. Elvira, 10 km NE Altagracia, 630 m, (2). MÉRIDA, 4 km E Tabay, 2,100-2,107 m, (10). MIRANDA, Curupao, 5 km NNW Guarenas, 1,130-1,180 m, (68); nr. El Encantado, 13 km SE Caracas, 570 m, (2); Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (1); San Andrés, 16 km SSE Caracas, 950-1,144 m, (7). MONAGAS, San Agustín, 3 to 5 km NW Caripe, 1,160-1,345 m, (11). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (12); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (2); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (2); Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,200 m, (1); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 800 m, (3); 32 km S Pto. Ayacucho, 135 m, (3); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (5); Tamatama, Río Orinoco, 135 m, (5). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395 m, (2). ZULIA, Kasmera, 21 km SW Machiques, 270 m, (2); Novito, 19 km WSW Machiques, 1,135 m, (2). Total 563.

Carollia castanea H. Allen, 1890:19.

Humid lowlands west of Lago de Maracaibo and in T. F. Amazonas and low elevations in Andes. Netted near streams and other moist areas (100 percent); in evergreen forest (94 percent) and in a forest settlement (6 percent); 73-460 m; bh-T (12) and bmh-P (7).

Specimens collected: TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 300-460 m, (7). T. F. AMAZONAS, 32 km S Pto. Ayacucho, 135 m, (8). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (1); Kasmera, 21 km SW Machiques, 270 m, (3). Total 19.

Carollia perspicillata Linnaeus, 1758:31.

Throughout Venezuela, except at very high and at very dry localities. Caught in mist nets (90 percent) and found roosting in hollow trees (4 percent), culverts (3 percent), caves and crevices (2 percent), and houses (1 percent); near streams and in other moist areas (88 percent) or less often in dry places (12 percent); in evergreen forest (65 percent), openings such as marshes, pastures, croplands, orchards, and yards (30 percent), or in cloud, deciduous, and thorn forest (5 percent); 1-1,260 m (87 percent below 500 m); bms-T (32), bs-T (817), bh-T (1,646), bmh-T (529), bs-P (43), bh-P (512), bmh-P (724), bp-P (1), and bmh-MB (1).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 km NE Pto. Páez, 76 m, (22); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (232); 1 km W Pto. Páez, 76 m, (5); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (1); Río Cinaruco, 48 km NW Pto. Páez, 76 m, (1); Río Cinaruco, 65 km NW Pto. Páez, 76 m, (5). BARINAS, Altamira, 600-1,070 m, (94). BOLÍVAR, El Manaco, 59 to 67 km SE El Dorado, 150 m, (97); 5 km NNW Guasipati, 190 m, (1); Hato La Florida, 47 km ESE Caicara, 50 m, (4); Hato San José, 20 to 30 km W and NW La Paragua, 300-324 m, (73); Icabarú to 56 km NE Icabarú, 473-881 m, (115); Km 125, 70 to 85 km SSE El Dorado, 602-1,165 m, (109); Los Patos, 25 to 28 km SE El Manteco, 150 m, (33); Piedra Virgen, 70 km SSE El Dorado, 193-272 m, (52); Río Supamo, 50 km SE El Manteco, 150-350 m, (88). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (46); 2 to 14 km ENE, NNE, and W Montalbán, 598-1,007 m, (68). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (8). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (14); Cerro Socopo, 84 km NW Carora, 1,260 m, (1); 11 to 20 km NNE and ENE Mirimire, 5-270 m, (76); Riecito, 30 km S Mirimire, 300-460 m, (159); Río Socopito, 80 km NW Carora, 470-480 m, (7). GUÁRICO, Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (13); Hda. Elvira, 10 km NE Altagracia, 630 m, (3); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (1); Río Orituco, 10 km N Altagracia, 170 m, (19); San José de Tiznados, 52 km NNW Calabozo, 60 m, (1). LARA, Caserio Boro, 10 km N El Tocuyo, 518 m, (1). MIRANDA, Birongo, 60 m, (75); Cueva Ricardo Zuloaga, nr. El Encantado, 15 km SE Caracas, 548 m, (6); Curupao, 5 km NNW Guarenas, 1,130-1,180 m, (26); nr. El Encantado, 13 km SE Caracas, 570 m, (1); Parque Nac. Guatopo, 12 to 21 km NW Altagracia, 610-710 m, (48); Río Chico and 1 to 7 km N, E, and SSE Río Chico, 1 m, (91); San Andrés, 16 km SSE Caracas, 950-1,144 m, (13). MONAGAS, 3 km SW Caripe, 854 m, (13); Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (4); San Agustín, 3 to 5 km NW Caripe, 1,160-1,345 m, (29). NUEVA ESPARTA, Isla Margarita, 3 km NNE La Asunción, 38-42 m, (3). SUCRE, 14 to 21 km E Cumaná, 1-40 m, (26); Ensenada Cauranta, 9 to 12 km NE Güiria, 1-90 m, (91); Manacal, 26 km ESE Carúpano, 176-380 m, (73). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 300-460 m, (428). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (10); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (287); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (59); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 800 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (43); 25 to 65 km SSE, S, and SSW Pto. Ayacucho, 114-195 m, (414); Río Mavaca, 108 km SSE Esmeralda, 140 m, (77); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (359); Tamatama, Río Orinoco, 135 m, (154). TRUJILLO, La Ceiba, 46 to 52 km WNW Valera, 23-29 m, (11); 19 to 26 km N, NW, and WNW Valera, 90-164 m, (214). YARACUY, Minas de Aroa, 20 km NW San Felipe, 380-400 m, (28). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (25); nr. Cerro Azul, 33 km NW La Paz, 75-80 m, (12); El Rosario, 39 to 65 km WNW Encontrados, 37-125 m, (130); Kasmera, 21 km SW Machiques, 270 m, (21); Novito, 19 km WSW Machiques, 1,135 m, (4). CARABOBO, FALCÓN, and YARACUY, 2.5 to 24 km NW, N, and NE Urama, 25-60 m, (180). Total 4,305.

Carollia sp. ?

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (116). BARINAS, Altamira to 2 km SW Altamira, 620-794 m, (45). BOLÍVAR, El Manaco, 56 to 67 km SE El Dorado, 150 m, (159); 5 km NNW Guasipati, 190 m, (4); Icabarú, 473 m, (1); Km 125, 85 km SSE El Dorado, 1,032-1,165 m, (32); Los Patos, 25 km SE El Manteco, 350 m, (1); Río Supamo, 50 km SE El Manteco, 150-350 m, (4). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (40); Montalbán to 7 km SW Montalbán, 598 m, (52). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (9). GUÁRICO, Hda. Elvira, 10 km NE Altagracia, 630 m, (7). MIRANDA, Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (1). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (224); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (5); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); 25 to 30 km SSW Pto. Ayacucho, 114-135 m, (3); Río Mavaca, 108 km SSE Esmeralda, 140 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (855); Tamatama, Río Orinoco, 135 m, (23). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (15); El Rosario, 37 to 61 km WNW Encontrados, 26-76 m, (158); Kasmera, 21 km SW Machiques, 270 m, (14). FALCÓN and YARACUY, 11 to 19 km NW Urama, 25-60 m, (25). Total 1,797.

Rhinophylla pumilio Peters, 1865a:355.

Southern Venezuela. Caught in mist nets (100 percent); near streams and in other moist areas (100 percent); usually in evergreen forest (72 percent) and forest openings such as pastures, yards, and orchards (23 percent), and rarely in deciduous forest (5 percent); 76-1,400 m; bs-T (10), bh-T (20), bmh-T (1), bh-P (4), bmh-P (21), and bp-MB (5).

Specimens collected: APURE, Río Cinaruco, 65 km NW Pto. Páez, 76 m, (3). BOLÍVAR, El Manaco, 59 to 67 km SE El Dorado, 150 m, (6); 28 km NE Icabarú, 775 m, (2); km 125, 85 km SSE El Dorado, 761-1,165 m, (21); Río Supamo, 50 km SE El Manteco, 150-350 m, (2). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400 m, (5); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (7); 25 to 65 km SSW Pto. Ayacucho, 114-161 m, (9); Tamatama, Río Orinoco, 135 m, (5). Total 61.

Subfamily STURNIRINAE

Sturnira bidens Thomas, 1915b:311.

High elevations in the Andes. Caught in mist nets (100 percent); near streams (50 percent) or in drier sites (50 percent); in cloud forest (100 percent); 2,550-2,640 m; bp-M (16).

Specimens collected: MÉRIDA, 4 to 6 km E and ESE Tabay, 2,550-2,640 m, (16). Total 16.

Sturnira bogotensis Shamel, 1927:129.

Mérida and Táchira Andes. Netted (100 percent); near streams and other moist areas (75 percent) or in dry sites (25 percent); in evergreen or cloud forest (75 percent) and in forest openings such as yards (25 percent); 2,107-2,640 m; bh-MB (1), bmh-MB (1), and bp-M (2).

Specimens collected: MÉRIDA, 4 to 6 km E and ESE Tabay, 2,107-2,640 m, (3). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,380 m, (1). Total 4.

Sturnira erythromos Tschudi, 1844:64.

Mountains of northern and western Venezuela. Mist netted (100 percent); over and near streams (16 percent) and in other moist areas (79 percent) or in dry situations (5 percent); in evergreen (60 percent) and cloud forest (27 percent), openings such as yards and pastures (12 percent), and deciduous forest (1 percent); 1,135-2,550 m; bh-P (4), bmh-P (8), bh-MB (64), bmh-MB (31), and bp-M (1).

Specimens collected: CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (7). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,400-1,542 m, (53). MÉRIDA, La Carbonera, 6 to 12 km SE La Azulita, 1,870-2,190 m, (25); 4 to 6 km E and ESE Tabay, 2,107-2,550 m, (2). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160 m, (1). MONAGAS, nr. San Agustín, 3 km NW Caripe, 1,165-1,345 m, (3). ZULIA, Novito, 19 km WSW Machiques, 1,135 m, (1). DTO. FEDERAL and MIRANDA, Alto Ño León, 31 to 33 km WSW Caracas, 1,750-1,945 m, (4); Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,092-2,240 m, (12). Total 108.

Sturnira lilium E. Geoffroy, 1810:181.

Throughout the forested parts of Venezuela, except for very high and very dry regions. Caught in mist nets (99 percent) or found roosting in houses and hollow trees (1 percent); near streams (54 percent) and other moist areas (36 percent), or sometimes in dry situations (10 percent); in evergreen forest (38 percent), yards, croplands, and pastures (29 percent), orchards (24 percent), deciduous and thorn forest (6 percent), cloud forest (2 percent), and swamps (1 percent); 1-1,982 m (91 percent below 1,000 m); bms-T (51), bs-T (281), bh-T (1,305), bmh-T (120), bs-P (19), bh-P (236), bmh-P (202), bh-MB (70), and bmh-MB (7).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (93). ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,100 m, (2). BARINAS, Altamira to 7 km NNE and SW Altamira, 611-1,070 m, (104). BOLÍVAR, El Manaco, 56 to 59 km SE El Dorado, 150 m, (190); Icabarú to 45 km NE Icabarú, 473-851 m, (57); Km 125, 70 to 85 km SSE El Dorado, 569-1,165 m, (27); Los Patos, 25 km SE El Manteco, 150 m, (8); Río Supamo, 50 km SE El Manteco, 150 m, (9). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (13); nr. Montalbán, 562-752 m, (22). DTO. FEDERAL, Alto Ño León, 33 km WSW Caracas, 1,665 m, (1); Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (14); Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (32); Los Venados, 4 km NNW Caracas, 1,400-1,560 m, (55); Pico Ávila, nr. Boca de Tigre, 6 km NNW Caracas, 1,982 m, (1). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (6); Cerro Socopo, 84 km NW Carora, 1,260 m, (6); 16 km ENE Mirimire, 70 m, (2); Río Socopito, 80 km NW Carora, 470-480 m, (16). GUÁRICO, Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (27); Hda. Elvira, 10 km NE Altagracia, 630 m, (14); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (1); Río Orituco, 10 km N Altagracia, 470 m, (11). LARA, Caserio Boro, 10 km N El Tocuyo, 518-528, (6). MIRANDA, Birongo, 60 m, (31); Curupao, 5 km NNW Guarenas, 1,130-1,180 m, (30); Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (42); 1 to 7 km E, SSE, and S Río Chico, 1 m, (29); San Andrés, 16 km SSE Caracas, 950-1,144 m, (18). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1); nr. San Agustín, 3 to 5 km NW Caripe, 1,160-1,345 m, (37). SUCRE, 14 to 21 km E Cumaná, 1 m, (45); Ensenada Cauranta, 9 to 12 km NE Güiria, 1-90 m, (45); Manacal, 26 km ESE Carúpano, 170-380 m, (15). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (27); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); 14 to 33 km S and SSE Pto. Ayacucho, 114-195 m, (121); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (626). TRUJILLO, La Ceiba, 48 km WNW Valera, 27 m, (1); 19 to 25 km N and NW Valera, 90-164 m, (161). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (117); nr. Cerro Azul, 33 km NW La Paz, 75 m, (1); El Rosario, 42 to 63 km WNW Encontrados, 24-125 m, (20); Kasmera, 21 km SW Machiques, 270 m, (6); Novito, 19 km WSW Machiques, 1,135 m, (4). CARABOBO, FALCÓN, and YARACUY, 6 to 19 km NW Urama, 25-60 m, (195). Total 2,291.

Sturnira ludovici Anthony, 1924:8.

Mountains and foothills of northern and western Venezuela. Caught in mist nets (99.7 percent) and by hand in a house (0.3 percent); near streams (17 percent) and in other moist areas (70 percent) or occasionally in dry situations (13 percent); in evergreen (72 percent), deciduous (6 percent), and cloud forest (6 percent), orchards (8 percent), yards (6 percent), and gardens, pastures, and marshes (2 percent); 24-2,240 m (80 percent between 500 and 1,500 m); bs-T (23), bh-T (6), bmh-T (9), bs-P (1), bh-P (89), bmh-P (174), bh-MB (33), and bmh-MB (28).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (9). ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,100 m, (1). BARINAS, Altamira to 2 km SW Altamira, 609-794 m, (156). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (15); 2 to 13.5 km NE and SE Montalbán, 598-1,007 m, (3). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (1); Los Venados, 4 km NNW Caracas, 1,400-1,544 m, (25). GUÁRICO, Hda. Elvira 10 km NE Altagracia, 630 m, (21). MÉRIDA, La Carbonera, 12 km SE La Azulita, 2,150-2,190 m, (18); 4 km E Tabay, 2,107 m, (2). MIRANDA, Birongo, 60 m, (6); Curupao, 5 km NNW Guarenas, 1,000-1,180 m, (63); Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (16); San Andrés, 16 km SSE Caracas, 1,144 m, (1). MONAGAS, nr. San Agustín, 3 to 5 km NW Caripe, 1,160-1,345 m, (8). ZULIA, Novito, 19 km WSW Machiques, 1,135 m, (2). DTO. FEDERAL and MIRANDA, Alto Ño León, 31 to 33 km WSW Caracas, 1,750-2,024 m, (4); Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,092-2,240 m, (12). Total 363.

Sturnira tildae de la Torre, 1959:1.

Humid lowlands and low mountains of southern and eastern Venezuela. Caught in mist nets (100 percent); near streams (46 percent) and in other moist areas (53 percent) or rarely in dry places (1 percent); in evergreen forest (87 percent) and in forest openings such as orchards (12 percent) and yards (1 percent); 90-1,165 m; bh-T (32), bmh-T (111), bh-P (2), and bmh-P (73).

Specimens collected: BOLÍVAR, El Manaco, 56 to 59 km SE El Dorado, 150 m, (3); 45 km NE Icabarú, 851 m, (15); Km 125, 70 to 85 km SSE El Dorado, 882-1,165 m, (58). SUCRE, Ensenada Cauranta, 12 km NE Güiria, 90 m, (1); Manacal, 26 km ESE Carúpano, 300 m, (1). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (110); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (8); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (3); Río Mavaca, 108 km SSE Esmeralda, 140 m, (15); Tamatama, Río Orinoco, 135 m, (3). Total 218.

Sturnira sp. ?

Specimens collected: DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (26). MIRANDA, Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); 25 km S Pto. Ayacucho, 114 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 30.

Subfamily STENODERMATINAE

Uroderma bilobatum Peters, 1866b:394.

Throughout all except the driest lowlands of Venezuela. Mist netted (98 percent) or found in roosts (2 percent); over or near streams (46 percent) and in other moist areas (26 percent) or in dry situations (28 percent); in yards, orchards, croplands, and pastures (46 percent), evergreen forest (44 percent), deciduous and thorn forest (8 percent), cloud forest (1 percent), and swamps (1 percent); 1-1,537 m (98 percent below 1,000 m); bms-T (9), bs-

T (158), bh-T (225), bmh-T (132), bs-P (11), bh-P (56), and bmh-P (86).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (38). BARINAS, Altamira to 2 km SW Altamira, 609-794 m, (65). BOLÍVAR, El Manaco, 59 to 67 km SE El Dorado, 150 m, (12); 23 to 45 km NE Icabarú, 824-851 m, (16). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (4); Montalbán to 2 km SE Montalbán, 598 m, (10). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (3). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (13); 14 to 16 km ENE Mirimire, 60-122 m, (36); Río Socopito, 80 km NW Carora, 470-480 m, (20). GUÁRICO, Est. Biol. de los Llanos, 9 km SE Calabozo, 100 m, (1); Hda. Elvira, 10 km NE Altagracia, 630 m, (1); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (1). LARA, Caserio Boro, 10 km N El Tocuyo, 518-537 m, (9). MIRANDA, Birongo, 60 m, (10); Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (1); 1 to 7 km E, SSE, and S Río Chico, 1 m, (16); San Andrés, 16 km SSE Caracas, 1,144 m, (6). MONAGAS, nr. San Agustín, 3 to 5 km NW Caripe, 1,160-1,165 m, (3). SUCRE, Ensenada Cauranta, 9 to 11 km NE Güiria, 7-40 m, (3); Manacal, 26 km ESE Carúpano, 175-300 m, (2). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (5). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (93); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); 14 to 65 km SSE, S, and SSW Pto. Ayacucho, 119-161 m, (7); Río Mavaca, 108 km SSE Esmeralda, 140 m, (8); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (36); Tamatama, Río Orinoco, 135 m, (9). TRUJILLO, La Ceiba, 46 to 48 km WNW Valera, 23-29 m, (59); 19 to 25 km N and NW Valera, 90-164 m, (25). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-400 m, (15). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (3); El Rosario, 39 to 63 km WNW Encontrados, 24-125 m, (94); Kasmera, 21 km SW Machiques, 270 m, (29); Novito, 19 km WSW Machiques, 1,135 m, (2). CARABOBO and YARACUY, 10 to 11 km NW Urama, 25 m, (20). Total 677.

Uroderma magnirostrum Davis, 1968:679.

Widespread in humid lowlands. Caught in mist nets (99.7 percent) and hand caught in a house (0.3 percent); over and near streams (89 percent) and in other moist areas (7 percent), or rarely in dry sites (4 percent); in yards (81 percent), pastures, orchards, and croplands (7 percent), evergreen forest (6 percent), swamps (4 percent), and thorn forest (2 percent); 1-1,140 m (99.5 percent below 500 m); bs-T (28), bh-T (318 — 87 percent), bmh-T (18), and bh-P (3).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (18). BOLÍVAR, 23 km NE Icabarú, 824 m, (1). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (8); 16 km ENE Mirimire, 70 m, (2); Río Socopito, 80 km NW Carora, 480 m, (1); 19 km NW Urama, 25 m, (3). GUÁRICO, Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (12); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (1). MIRANDA, Curupao, 5 km NNW Guarenas, 1,140 m, (1); 1 to 4 km E and S Río Chico, 1 m, (3). SUCRE, Manacal, 26 km ESE Carúpano, 380 m, (1). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); 14 to 25 km S and SSE Pto. Ayacucho, 114-119 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (208); Tamatama, Río Orinoco, 135 m, (90). TRUJILLO, La Ceiba, 46 km WNW Valera, 29 m, (1). ZULIA, El Rosario, 39 to 63 km WNW Encontrados, 24-125 m, (9); Kasmera, 21 km SW Machiques, 270 m, (4). Total 367.

Uroderma sp. ?

Specimens collected: DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (2). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (5). Total 10.

Vampyrops aurarius Handley and Ferris, 1972: 522.

Mountains of southern Venezuela. Caught in mist nets (100 percent); near streams (10 percent) and in other moist areas (89 percent), or rarely in dry sites (1 percent); in evergreen forest (100 percent); 700-1,400 m (90 percent above 1,000 m); bmh-P (58), bp-P (3), and bp-MB (1).

Specimens collected: BOLÍVAR, Km 125, 85 km SSE El Dorado, 882-1,165 m, (58). T. F. AMAZONAS, Cabecera del Caño Negro, Cerro Duida, 32 km NW Esmeralda, 1,400 m, (1); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 700-800 m, (3). Total 62.

Vampyrops brachycephalus Rouk and Carter, 1972:1.

Low mountains of northeastern Venezuela. Mist netted over streams in evergreen forest

(100 percent); 175-375 m; bs-P (2) and bh-P (2).

Specimens collected: SUCRE, Manacal, 26 km ESE Carúpano, 175-375 m, (4). Total 4.

Vampyrops helleri Peters, 1866b:392.

Throughout the humid lowlands and foothills of Venezuela. Caught in mist nets (100 percent); over and near streams (38 percent) and in other moist habitats (40 percent), or in dry situations (22 percent); in evergreen forest (52 percent) and openings such as yards (37 percent), orchards (6 percent), and croplands and pastures (2 percent), as well as occasionally in swamps (2 percent), thorn and deciduous forest (1 percent), and cloud forest (0.1 percent); 1-1,537 m (99 percent below 1,000 m); bs-T (38), bh-T (403 = 49 percent), bmh-T (42), bs-P (3), bh-P (221 = 27 percent), and bmh-P (114).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (36). BARINAS, Altamira to 2 km SW Altamira, 609-794 m, (100). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (13); Hato La Florida, 47 km ESE Caicara, 50 m, (1); Hato San José, 20 km W La Paragua, 306-324 m, (2); 23 to 45 km NE Icabarú, 824-851 m, (5); Río Supamo, 50 km SE El Manteco, 150 m, (1). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (8); 2 to 3 km SE and SW Montalbán, 598-618 m, (2). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380 m, (1). FALCÓN, 14 to 16 km ENE Mirimire, 60-122 m, (15); Río Socopito, 80 km NW Carora, 480 m, (1). GUÁRICO, Río Orituco, 10 km N Altagracia, 470 m, (1). MIRANDA, Birongo, 60 m, (9); Curupao, 5 km NNW Guarenas, 1,160-1,180 m, (5); Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (4); 1 to 7 km E, SSE, and S Río Chico, 1 m, (16). SUCRE, Ensenada Cauranta, 9 km NE Güiria, 1 m, (1); Manacal, 26 km ESE Carúpano, 175-380 m, (7). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (6); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (3); 14 to 65 km SSE, S, and SSW Pto. Ayacucho, 114-195 m, (180); Río Mavaca, 108 km SSE Esmeralda, 140 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (154); Tamatama, Río Orinoco, 135 m, (9). TRUJILLO, La Ceiba, 46 km WNW Valera, 29 m, (1); 23 to 25 km N and NW Valera, 90-164 m, (5). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-400 m, (197). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (3); El Rosario, 37 to 65 km WNW Encontrados, 24-125 m, (18); Kasmera, 21 km SW Machiques, 270 m, (1); Novito, 19 km WSW Machiques, 1,135 m, (2). FALCÓN and YARACUY, 11 to 19 km NW Urama, 25 m, (12). Total 821.

Vampyrops umbratus Lyon, 1902:151.

Mountains of northern and western Venezuela. Caught in mist nets (100 percent); over or near streams (61 percent) and in other moist areas (30 percent), or in dry situations (9 percent); in evergreen forest (67 percent) and openings such as yards, orchards, pastures, and croplands (23 percent), in cloud forest (9 percent), and rarely in deciduous forest (1 percent); 395-2,550 m (99.5 percent above 1,000 m); bh-P (38), bmh-P (18), bh-MB (136), bmh-MB (23), and bp-M (6).

Specimens collected: ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,100 m, (5). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (13). DTO. FEDERAL, Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (15); Los Venados, 4 km NNW Caracas, 1,400-1,559 m, (54). MÉRIDA, La Carbonera, 12 km SE La Azulita, 2,150-2,190 m, (5); 4 to 6 km ESE and E Tabay, 2,107-2,550 m, (10). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160-1,180 m, (34). MONAGAS, San Agustín, 3 to 5 km NW Caripe, 1,165-1,180 m, (3). TRUJILLO, Hda. Misisí, 13 km E Trujillo, 1,830 m, (3). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395 m, (1). DTO. FEDERAL and MIRANDA, Alto Ño León, 31 to 33 km WSW Caracas, 1,665-1,945 m, (8); Pico Ávila, 5 km NNE and 6 km NNW Caracas, 2,025-2,250 m, (70). Total 221.

Vampyrops vittatus Peters, 1859:225.

Mountains of northern and western Venezuela. Caught in mist nets (100 percent); mostly in moist (90 percent), but occasionally in dry sites (10 percent); in evergreen forest (89 percent) and in a yard in a forest opening (11 percent); 619-2,119 m; bmh-P (2) and bh-MB (8).

Specimens collected: BARINAS, Altamira and 2 km SW Altamira, 619-794 m, (2). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,400-1,507 m, (7); Pico Ávila (nr. Boca de Tigre), 6 km NNW Caracas, 2,119 m, (1). Total 10.

Vampyrodes caraccioli Thomas, 1889:167.

Scattered localities in T. F. Amazonas (3), Bolívar (2), and Miranda (1). Mist netted (100 percent); near streams (87 percent) and in other moist areas (13 percent); in evergreen forest (91 percent) and forest openings such as yards and orchards (9 percent); 60-1,032 m (96 percent below 500 m); bh-T (4), bmh-T (18), and bmh-P (1).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Km 125, 85 km SSE El Dorado, 1,032 m, (1). MIRANDA, Birongo, 60 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (18); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (1). Total 23.

Vampyressa bidens Dobson, 1878:535.

Humid lowlands of southern Venezuela. Caught in mist nets (100 percent); near streams and in other moist areas (100 percent); in evergreen forest (68 percent), pasture (17 percent), yards (10 percent), orchards (3 percent), and swamps (2 percent); 24-851 m (99 percent below 500 m); bs-T (20), bh-T (28), bmh-T (66), bh-P (2), and bmh-P (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (2); 45 km NE Icabarú, 851 m, (1); Los Patos, 28 km SE El Manteco, 150 m, (1); Río Supamo, 50 km SE El Manteco, 150 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (64); 14 to 65 km SSE to SSW Pto. Ayacucho, 119-161 m, (24); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (22). Total 117.

Vampyressa pusilla Wagner, 1843a:366.

Southern and western Venezuela. Caught in mist nets (99 percent) and by hand in a house (1 percent); near streams (5 percent) and other moist areas (73 percent), as well as in dry sites (22 percent); usually in evergreen forest (92 percent), and rarely in yards (5 percent), orchards (1 percent), croplands (1 percent), and swamps (1 percent); 23-1,537 m (86 percent above 500 m); bs-T (1), bh-T (1), bmh-T (7), bh-P (14), bmh-P (91), and bh-MB (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (7). BARINAS, Altamira to 2 km SW Altamira, 609-794 m, (33). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (58); 9 km N Montalbán, 727-773 m, (6). DTO. FEDERAL, Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (1). MIRANDA, Curupao, 5 km NNW Guarenas, 1,180 m, (1). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). TRUJILLO, La Ceiba, 52 km WNW Valera, 23 m, (1). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-400 m, (7). Total 115.

Chiroderma salvini Dobson, 1878:532.

Mountains of northern and western Venezuela. Caught in mist nets (97 percent) and by hand in a house (3 percent); usually in moist (79 percent), or less often in dry situations (21 percent); in evergreen forest (56 percent), forest openings such as roadways, yards, orchards, and fields (35 percent), and rarely in cloud forest (9 percent); 611-2,240 m (93 percent above 1,000 m); bh-P (9), bmh-P (10), and bh-MB (10).

Specimens collected: BARINAS, 2 km SW Altamira, 611 m, (1). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (9). DTO. FEDERAL, Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (2); Los Venados, 4 km NNW Caracas, 1,465-1,559 m, (2); Pico Ávila (=Hotel Humboldt and Boca de Tigre), 5 km NNE and 6 km NNW Caracas, 2,118-2,240 m, (6). MIRANDA, Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (1). MONAGAS, nr. San Agustín, 3 to 5 km NW Caripe, 1,160-1,180 m, (8). Total 29.

Chiroderma trinitatum Goodwin, 1958:1.

Southern Venezuela (Bolívar and T. F. Amazonas) and eastern foothills of Andes. Caught in mist nets (100 percent); usually over or near streams and in other moist areas (95 percent), but rarely in dry situations (5 percent); in evergreen forest (67 percent) or in forest openings such as yards (24 percent), orchards (6 percent), or fields (3 percent); 24-1,032 m (97 percent below 500 m); bs-T (2), bh-T (30), bmh-T (30), bh-P (3), and bmh-P (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2). BARINAS, Altamira, 794 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (11); Km 125, 85 km SSE El Dorado, 1,032 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (28); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (2); 25 to 30 km S Pto. Ayacucho, 114-135 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 135-155 m, (9); Tamatama, Río Orinoco, 135 m, (6). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-400 m, (3). Total 67.

Chiroderma villosum Peters, 1860:748.

Humid lowlands throughout Venezuela. Caught in mist nets (99.6 percent) or by hand in hollow trees and houses (0.4 percent); over or near streams and in other moist areas (98 percent), or in dry situations (2 percent); mostly in yards (63 percent) and other openings such as orchards, fields, and pastures (17 percent), but occasionally in evergreen forest (20 percent); 24-851 m (99 percent at elevations less than 500 m); bs-T (49), bh-T (642), bmh-T (16), bh-P (15), and bmh-P (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (8). BARINAS, 2 km SW Altamira, 619 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (18); Hato La Florida, 47 km ESE Caicara, 50 m, (1); Hato San José, 20 km W La Paragua, 306 m, (2); 23 to 45 km NE Icabarú, 473-851 m, (7); Río Supamo, 50 km SE El Manteco, 150 m, (1). FALCÓN, Río Socopito, 80 km NW Carora, 480 m, (2); 19 km NW Urama, 25 m, (6). SUCRE, Manacal, 26 km ESE Carúpano, 300 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (8); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Esmeralda, Río Orinoco, 135 m, (2); Pto. Ayacucho to 65 km SSW Pto. Ayacucho, 114-161 m, (122); Río Mavaca, 108 km SSE Esmeralda, 140 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (494); Tamatama, Río Orinoco, 135 m, (36). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395 m, (8). ZULIA, nr. Cerro Azul, 35 km NW La Paz, 80 m, (1); El Rosario, 42 to 48 km WNW Encontrados, 24-54 m, (2). Total 724.

Chiroderma sp. ?

Specimens collected: T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (5). Total 5.

Ectophylla macconnelli Thomas, 1901b:145.

Bolívar, T. F. Amazonas, and eastern Andean foothills. Mist netted (99 percent) and found roosting in a tree (1 percent); mostly near streams and other moist areas (96 percent), but occasionally in dry places (4 percent); in evergreen forest (93 percent) and in forest settlements (7 percent); 24-1,032 m (97 percent below 500 m); bh-T (59), bmh-T (10), and bmh-P (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2). BARINAS, 2 km SW Altamira, 619 m, (1). BOLÍVAR, Km 125, 85 km SSE El Dorado, 1,032 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (8); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (51); 25 km S Pto. Ayacucho, 114 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (4). Total 71.

Artibeus cinereus Gervais, 1856:36.

Throughout the humid portions of Venezuela, except at high elevations. Caught in mist nets (99 percent) and by hand in a house at night and roosting under a banana leaf (1 percent); near streams and in other moist areas (86 percent), or in dry sites (14 percent); in evergreen forest (82 percent), yards and orchards (12 percent), and in swamps, croplands, cloud forest, deciduous forest, thorn forest, and pastures (6 percent, in descending order of frequency); 1-2,119 m (57 percent between 1,000 and 2,000 m); bs-T (31), bh-T (16), bmh-T (32), bs-P (1), bh-P (70), bmh-P (254), bp-P (3), bh-MB (29), and bmh-MB (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (31). BARINAS, Altamira, 609-1,070 m, (24). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (3); Hato San José, 20 km W La Paragua, 300-324 m, (5); 23 to 45 km NE Icabarú, 824-851 m, (3); Km 125, 85 km SSE El Dorado, 826-1,165 m, (120); Río Supamo, 50 km SE El Manteco, 150 m, (2). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (104); 3 to 13.5 km W and NE Montalbán, 657-1,007 m, (10). DTO. FEDERAL, Alto Ño León, 33 km WSW Caracas, 1,665 m, (1); Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (5); Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (1); I.V.I.C., 15 km SW Caracas, 1,600 m, (1); Los Venados, 4 km NNW Caracas, 1,410-1,542 m, (13); Pico Ávila, nr. Boca de Tigre, 6 km NNW Caracas, 1,982-2,119 m, (7). FALCÓN, 14 to 16 km ENE Miremire, 70-122 m, (4); Río Socopito, 80 km NW Carora, 480 m, (1); 19 km NW Urama, 25 m, (2). GUÁRICO, 10 km N and NE Altagracia, 470-630 m, (3); Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (3). MÉRIDA, 4 km E Tabay, 2,077-2,107 m, (2). MIRANDA, Curupao, 5 km NNW Guarenas, 1,130-1,180 m, (25); nr. El Encantado, 13 km SE Caracas, 570 m, (1); Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (2); 1 to 7 km E and S Río Chico, 1 m, (11); San Andrés, 16 km SSE Caracas, 950-1,144 m, (5). MONAGAS, San Agustín, 5 km NW Caripe, 1,165-1,180 m, (5). SUCRE, Ensenada Cauranta, 9 to 11 km NE Güiria, 1-75 m, (9); Manacal, 26 km ESE Carúpano, 175-575 m, (11). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (2). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 800 m, (3); Tamatama, Río Orinoco, 135 m, (1). TRUJILLO, Hda. Misisí, 13 km E Trujillo, 1,830 m, (2). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-400 m, (3). ZULIA, El Rosario, 48 to 65 km WNW Encontrados, 54-125 m, (9); Novito, 19 km WSW Machiques, 1,135 m, (2). Total 438.

Artibeus concolor Peters, 1865a:357.

T. F. Amazonas and southern Bolívar. Caught in mist nets (100 percent); in moist areas or near streams (100 percent); in evergreen forest (27 percent) or in yards (68 percent) and other openings such as pasture and orchards (5 percent); 114-1,032 m (84 percent below 500 m); bs-T (2), bh-T (95), bmh-T (3), bh-P (1), and bmh-P (19).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (7); 23 km NE Icabarú, 824 m, (1); Km 125, 85 km SSE El Dorado, 500-1,032 m, (19). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); 14 to 65 km SSW Pto. Ayacucho, 114-161 m, (4); Río Mavaca, 108 km SSE Esmeralda, 140 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (10); Tamatama, Río Orinoco, 135 m, (72). Total 120.

Artibeus fuliginosus Gray, 1838:487.

Bolívar and T. F. Amazonas. Caught in mist nets (99.7 percent) and by hand in a house at night (0.3 percent); near streams (91 percent) and in other moist areas (9 percent), or rarely in dry sites (0.3 percent); in evergreen forest (59 percent), yards (36 percent) and other openings such as orchards, pastures, and croplands (5 percent), and rarely cloud forest (0.3 percent); 114-1,032 m (97 percent below 500 m); bs-T (6), bh-T (235), bmh-T (60), bh-P (8), bmh-P (11), and bh-MB (1).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Hato San José, 20 km W La Paragua, 306 m, (2); Icabarú to 45 km NE Icabarú, 478-851 m, (8); Km 125, 85 km SSE El Dorado, 569-1,032 m, (4); Los Patos, 28 km SE El Manteco, 150 m, (4); Río Supamo, 50 km SE El Manteco, 150 m, (4). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (14); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (46); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (3); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (28); 25 to 65 km SSW Pto. Ayacucho, 114-161 m, (7); Río Mavaca, 108 km SSE Esmeralda, 140 m, (70); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (48); Tamatama, Río Orinoco, 135 m, (82). Total 321.

Artibeus hartii Thomas, 1892:409.

Northern Venezuela and T. F. Amazonas. Netted (100 percent); mostly near streams and in other moist situations (89 percent), but occasionally in dry places (11 percent); in evergreen (41 percent), cloud (13 percent), and deciduous forest (4 percent), or in openings such as pastures (18 percent), yards (16 percent), and gardens, orchards, and marshes (8 percent); 2-2,250 m (91 percent between 1,000 and 2,250 m); bs-T (5), bh-T (1), bh-P (12), bmh-P (11), bh-MB (90), and bmh-MB (7).

Specimens collected: ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,100 m, (1). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (7). DTO. FEDERAL, Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (1); Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380 m, (4); Los Venados, 4 km NNW Caracas, 1,400-1,559 m, (34); Pico Ávila, nr. Hotel Humboldt and Boca de Tigre, 5 km NNE and 6 km NNW Caracas, 1,982-2,250 m, (63); FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (1); Riecito, 30 km S Mirimire, 300 m, (1); Río Socopito, 80 km NW Carora, 470 m, (1). GUÁRICO, Hda. Elvira, 10 km NE Altagracia, 630 m, (3). MIRANDA, San Andrés, 16 km SSE Caracas, 1,144 m, (3). MONAGAS, San Agustín, 3 to 5 km NW Caripe, 1,160-1,180 m, (4). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). ZULIA, Novito, 19 km WSW Machiques, 1,135 m, (2). Total 126.

Artibeus jamaicensis Leach, 1821:75.

Almost everywhere in Venezuela, except in the highest and driest places. Caught in mist nets (98 percent) or in roosts, mostly houses (2 percent); usually near streams and in other moist areas (84 percent), but sometimes in dry sites (16 percent); in openings such as yards, orchards, pastures, and croplands (48 percent, in order of decreasing frequency), evergreen forest (33 percent), deciduous forest (8 percent), thorn forest (5 percent), swamp (5 percent), and cloud forest (1 percent); 1-2,135 m (83 percent below 500 m, 99 percent below 1,500 m); bms-T (144), bs-T (853), bh-T (694), bmh-T (149), bs-P (74), bh-P (232), bmh-P (76), bp-P (2), bh-MB (56), and bp-MB (22).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (106); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (2). ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,100 m, (3). BARINAS, Altamira and 1 to 2 km S and SW Altamira, 600-794 m, (35). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); 5 km NNW Guasipati, 190 m, (4); Hato La Florida, 47 km ESE Caicara, 50 m, (1); Hato San José, 20 km W La Paragua, 300-324 m, (22); 21 to 45 km NE Icabarú, 775-851 m, (12); Km 125, 85 km SSE El Dorado, 569-1,165 m, (7). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (8); nr. Montalbán, 598-1,007 m, (78). DTO. FEDERAL, Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (12); Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (6); Los Venados, 4 km NNW Caracas, 1,400-1,557 m, (38); Pico Ávila (nr. Hotel Humboldt and Boca de Tigre), 5 km NNE and 6 km NNW Caracas, 1,982-2,135 m, (6). FALCÓN, Boca de Yaracuy, 28 km WNW pto. Cabello, 2 m, (31); 13 to 16 km ENE Mirimire, 60-270 m, (72); Riecito, 30 km S Mirimire, 300 m, (4); Río Socopito, 80 km NW Carora, 470-480 m, (53). GUÁRICO, Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (40); Hda. Elvira, 10 km NE Altagracia, 630 m, (16); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (10); Río Orituco, 10 km N Altagracia, 470 m, (5). LARA, Caserio Boro, 10 km N El Tocuyo, 518-528 m, (8). MIRANDA, Birongo, 60 m, (12); Curupao, 5 km NNW Guarenas, 1,130-1,180 m, (58); nr. El Encantado, 13 km SE Caracas, 570 m, (2); Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (18); nr. Río Chico, 1 m, (246); San Andrés, 16 km SSE Caracas, 950-1,144 m, (16). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (5); nr. San Agustín, 3 to 5 km NW Caripe, 1,160-1,180 m, (30). NUEVA ESPARTA, Isla Margarita, nr. La Asunción, 37-305 m, (53). SUCRE, 14 to 21 km E Cumaná, 1-15 m, (85); Ensenada Cuaranta, 9 to 12 km NE Güiria, 1-90 m, (63); Manacal, 26 km ESE Carúpano, 175-380 m, (22); San Fernando, 16 km SE Cumaná, 300 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (43); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (5); Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,140-1,200 m, (21); Cabecera del Caño Negro, Cerro Duida, 32 km NW Esmeralda, 1,650 m, (1); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 800 m, (1); 14 to 30 km S and SSE Pto. Ayacucho, 119-161 m, (26); Río Mavaca, 108 km SSE Esmeralda, 140 m, (117); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (306); Tamatama, Río Orinoco, 135 m, (33). TRUJILLO, La Ceiba, 46 to 53 km WNW Valera, 16-29 m, (5); 19 to 26 km N to WNW Valera, 90-164 m, (316). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395 m, (23). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (8); nr. Cerro Azul, 33 km NW La Paz, 75-80 m, (30); El Rosario, 42 to 63 km WNW Encontrados, 54-125 m, (70); Kasmera, 21 km SW Machiques, 270 m, (34); Novito, 19 km WSW Machiques, 1,135 m, (18). FALCÓN and YARACUY, 11 to 19 km NW Urama, 25 m, (54). Total 2,302.

Artibeus lituratus Olfers, 1818:224.

Throughout Venezuela, mostly at lower elevations. Caught in mist nets (98 percent) and in roosts, mostly houses (2 percent); near streams and in other moist areas (66 percent), or in dry uplands (34 percent); in evergreen (41 percent) and rarely in other types of forest such as deciduous, thorn, and cloud (2 percent), swamps and marshes (28 percent), yards (15 percent), and other openings such as orchards, croplands, and pastures (14 percent); 1-2,011 m (93 percent below 500 m); bms-T (10), bs-T (162), bh-T (459), bmh-T (828), bs-P (9), bh-P (76), bmh-P (57), bh-MB (18), and bmh-MB (1) (79 percent in bh-T and bmh-T).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 23-24 m, (827). BARINAS, Altamira, 609-1,070 m, (27). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (16); Hato San José, 20 km W La Paragua, 300-324 m, (4); Km 125, 85 km SSE El Dorado, 602-1,032 m, (13); Los Patos, 28 km SE El Manteco, 150-350 m, (7). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (5); Montalbán, 598-1,007 m, (4). DTO. FEDERAL, Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (1); Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380 m, (2); Los Venados, 4 km NNW Caracas, 1,476-1,559 m, (16); Pico Ávila, 6 km NNW Caracas, 2,011 m, (1). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (10); Cerro Socopo, 84 km NW Carora, 1,260 m, (1); nr. La Pastora, 14-16 km ENE Mirimire, 60-122 m, (11); Río Socopito, 80 km NW Carora, 470-480 m, (59). MIRANDA, Birongo, 60 m, (16); Curupao, 5 km NNW Guarenas, 1,130-1,180 m, (18); 1 to 7 km E and S Río Chico, 1 m, (29). NUEVA ESPARTA, Isla Margarita, 3 km NNE and 10 km WSW La Asunción, 38-47 m, (7). SUCRE, 16 to 21 km E Cumaná, 1-5 m, (3); Ensenada Cauranta, 9 to 12 km NE Güiria, 1-90 m, (24); Manacal, 26 km ESE Carúpano, 175-380 m, (18). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, 14 to 65 km SSE to SSW Pto. Ayacucho, 114-161 m, (14); Río Mavaca, 108 km SSE Esmeralda, 140 m, (2); San

Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (61); Tamatama, Río Orinoco, 135 m, (32). TRUJILLO, La Ceiba, 46 to 53 km WNW Valera, 16-29 m, (14); 19 to 26 km N, NW, and WNW Valera, 90-164 m, (24). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395 m, (9). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (1); El Rosario, 42 to 65 km WNW Encontrados, 24-95 m, (252); Kasmera, 21 km SW Machiques, 270 m, (50); Novito, 19 km WSW Machiques, 1,135 m, (11). FALCÓN and YARACUY, 10 to 19 km NW Urama, 25 m, (20). GUÁRICO and MIRANDA, Parque Nac. Guatopo, 10 to 21 km NE, N, and NW Altagracia, 470-630 m, (10). Total 1,620.

Artibeus sp. A.

Lowlands of Bolívar and T. F. Amazonas. Netted (100 percent); near streams and in other moist areas (92 percent), or in dry sites (8 percent); in evergreen forest (52 percent), or in openings such as savannas (25 percent) and yards and orchards (23 percent); 119-161 m; bs-T (12), bh-T (36), bmh-T (1), and bh-P (5).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (11); Los Patos, 28 km SE El Manteco, 150 m, (4); Río Supamo, 50 km SE El Manteco, 150 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); 14 to 65 km S, SSE, and SSW Pto. Ayacucho, 119-161 m, (17); Río Mavaca, 108 km SSE Esmeralda, 140 m, (7); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (6); Tamatama, Río Orinoco, 135 m, (6). Total 54.

Remarks: For notes on the systematics and nomenclature of this species, see Handley (in press).

Artibeus sp. D.

Foothills and lower slopes of the Sierra de Perijá. Found roosting in a damp cave in evergreen forest and netted in a yard in a forest opening; 270-1,135 m; bh-T (3) and bmh-P (1).

Specimens collected: ZULIA, Kasmera, 21 km SW Machiques, 270 m, (3); Novito, 19 km WSW Machiques, 1,135 m, (1). Total 4.

Remarks: For notes on the systematics and nomenclature of this species, see Handley (in press).

Artibeus sp. ?

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (2); Km 125, 85 km SSE El Dorado, 1,032 m, (1). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (2). FALCÓN, Río Socopito, 80 km NW Carora, 470 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); Tamatama, Río Orinoco, 135 m, (2). Total 12.

Ametrida centurio Gray, 1847:15.

Venezuela east of Lago de Maracaibo. Netted (100 percent); near streams and in other moist areas (97 percent), or rarely in dry situations (3 percent); in evergreen (75 percent), cloud (1 percent), and deciduous forest (1 percent), or in openings such as yards (21 percent) and orchards (2 percent); 90-2,150 m (93 percent below 1,500 m); bs-T (4), bh-T (25), bs-P (1), bh-P (5), bmh-P (101), bh-MB (14), and bmh-MB (1).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (4); 45 km NE Icabarú, 851 m, (1); Km 125, 85 km SSE El Dorado, 761-1,165 m, (100). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,400-1,559 m, (13); Pico Ávila (=Hotel Humboldt and Boca de Tigre), 5 km NNE and 6 km NNW Caracas, 2,013-2,150 m, (2). FALCÓN, Riecito, 30 km S Mirimire, 300 m, (1). GUÁRICO, Est. Biol. de los Llanos, 9 km SE Calabozo, 100 m, (1); Parque Nac. Guatopo, 12 km NNW Altagracia, 470 m, (1). MIRANDA, San Andrés, 16 km SSE Caracas, 1,144 m, (2). SUCRE, Ensenada Cauranta, 12 km NE Güiria, 90 m, (1); Manacal, 26 km ESE Carúpano, 175-380 m, (3). T. F. AMAZONAS, Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (19). TRUJILLO, 25 km NW Valera, 90 m, (1). Total 151.

Sphaeronycteris toxophyllum Peters, 1882:989.

Scattered localities of many habitat types throughout Venezuela. Caught in mist nets (100 percent); over and near streams (77 percent) and in other moist areas (13 percent), or in dry situations (10 percent); in openings such as yards (45 percent) and pastures, orchards, croplands, and marshes (9 percent), as well as in evergreen (39 percent), thorn (5 percent), deciduous (1 percent), and cloud forest (1 percent); 2-2,240 m; bs-T (22), bh-T (48), me-P (5), bh-P (4), bmh-P (2), and bh-MB (76).

Specimens collected: ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,100 m, (1). BOLÍVAR, Hato La Florida, 47 km SE Caicara, 50 m, (1); Hato San José, 20 km W La Paragua, 300-306 m, (8); 23 to 45 km NE Icabarú, 824-851 m, (2). DTO. FEDERAL, Boca de Tigre Valley, 5 km NW Caracas, 1,394 m, (1); Los Venados, 4 km NNW Caracas, 1,400-1,559 m, (68); Pico Ávila (=Hotel Humboldt and Boca de Tigre), 5 km NNE and 6 km NNW Caracas, 2,013-2,240 m, (7). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (3); Riecito, 30 km S Mirimire, 300 m, (1); Río Socopito, 80 km NW Carora, 480 m, (3). GUÁRICO, Est. Biol. de los Llanos, 9 km SE Calabozo, 100 m, (4); Hda. Elvira, 10 km NE Altagracia, 630 m, (1). LARA, La Concordia, 47 km NE El Tocuyo, 592 m, (5). MIRANDA, San Andrés, 16 km SSE Caracas, 1,144 m, (1). SUCRE, Manacal, 26 km ESE Carúpano, 380 m, (2). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); 65 km SSW Pto. Ayacucho, 161 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (10); Tamatama, Río Orinoco, 135 m, (34). ZULIA, El Rosario, 63 km WNW Encontrados, 125 m, (1). Total 157.

Centurio senex Gray, 1842:259.

Lowlands of western Venezuela.

Netted (100 percent); near streams and in other moist sites (60 percent), or in dry situations (40 percent); in a variety of habitats (20 percent each), including evergreen, deciduous, and thorn forests and openings such as yards and marshes; 2-125 m; bs-T (1), bh-T (3), and bmh-T (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (1). ZULIA, El Rosario, 42 to 65 km WNW Encontrados, 24-125 m, (3). Total 5.

Subfamily DESMODONTINAE

Desmodus rotundus E. Geoffroy, 1810:181.

At lower elevations throughout Venezuela. Netted (93 percent) or found roosting in caves (4 percent), hollow trees (2 percent), and houses (1 percent); near streams and other moist areas (85 percent), or in dry sites (15 percent); in all cover types, from a maximum of 28 percent in evergreen forest, to a minimum of 1 percent in cloud forest (or to summarize another way, 57 percent in forests of all types and 43 percent in yards, pastures, and other open habitats); 1-1,537 m (97 percent below 1,000 m); me-T (12), bms-T (74), bs-T (401), bh-T (237), bmh-T (42), me-P (7), bs-P (47), bh-P (66), bmh-P (77), and bh-MB (1) (55 percent in dry zones, 45 percent in humid zones).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 to 46 km NE Pto. Páez, 76 m, (8); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (26); 1 km W Pto. Páez, 76 m, (2); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (2); Río Cinaruco, 65 km NW Pto. Páez, 76 m, (2); San Rafael de Atamaica, 42 km SSE San Fernando de Apure, 100 m, (2). BARINAS, 2 to 7 km NNE and SW Altamira, 609-1,070 m, (63). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Hato San José, 20 km W La Paragua, 300-306 m, (16); 21 to 28 km NE Icabarú, 775-851 m, (7). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (10); nr. Montalbán, 598-1,007 m, (58). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (1); Los Venados, 4 km NNW Caracas, 1,498 m, (1). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (73); Capatárida, 40-55 m, (10); 14 km ENE Mirimire, 60-122 m, (4); Riecito, 30 km S Mirimire, 300 m, (13); Río Socopito, 80 km NW Carora, 470 m, (2). GUAJIRA, nr. Cojoro, 37 km NNE Paraguaipoa, 15 m, (1). GUÁRICO, 10 km NE Altagracia, 630 m, (24); Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, 100 m, (20); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (3); Río Orituco, 10 km N Altagracia, 470 m, (6). LARA, Caserio Boro, 10 km NE El Tocuyo, 580 m, (7). MIRANDA, Birongo, 60-160 m, (55); nr. El Encantado, 13 to 15 km SE Caracas, 570 m, (8); Río Chico and 1 to 10 km E and S Río Chico, 1 m, (45); San Andrés, 16 km SSE Caracas, 1,144 m, (3). MONAGAS, 3 km SW Caripe, 854 m, (17); Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (9); San Agustín, 3 to 5 km NW Caripe, 1,160-1,180 m, (10). NUEVA ESPARTA, Isla Margarita, 3 to 10 km NNE, S, and WSW La Asunción, 18-53 m, (57); Isla Margarita, 31 km W Porlamar, 10 m, (1). SUCRE, 16 to 21 km E Cumaná, 1-40 m, (17); Ensenada Cauranta, 9 to 12 km NE Güiria, 1-90 m, (6); Manacal, 26 km ESE Carúpano, 175-380 m, (11). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (4). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (3); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (13); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (4); Esmeralda, Río Orinoco, 135 m, (1); Pto. Ayacucho to 65 km SSE to SSW Pto. Ayacucho, 119-195 m, (58); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (113); Tamatama, Río Orinoco, 135 m, (13). TRUJILLO, 19 to 26 km N, NW, and WNW Valera, 90-164 m, (115). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (9); El Rosario, 42 to 60 km WNW Encontrados, 24-73 m, (2);

Kasmera, 21 km SW Machiques, 270 m, (15). CARABOBO, FALCÓN, and YARACUY, 6 to 19 km NW and N Urama, 25-60 m, (12). Total 964.

Desmodus youngii Jentink, 1893:282.

Scattered localities in the lowlands of Venezuela. Caught in mist nets (95 percent) and found in a house (5 percent); near streams and other moist areas (79 percent) or in dry sites (21 percent); in yards (42 percent), pasture (26 percent), evergreen forest (16 percent), orchards (11 percent), and thorn forest (5 percent); 1-480 m; me-T (1), bms-T (3), bs-T (8), and bh-T (7).

Specimens collected: BOLÍVAR, Hato San José, 20 km W La Paragua, 306 m, (1). FALCÓN, 6 km SE Capatárida, 50 m, (1); Río Socopito, 80 km NW Carora, 480 m, (1). SUCRE, 21 km E Cumaná, 1 m, (3); Ensenada Cauranta, 9 km NE Güiria, 4 m, (2). T. F. AMAZONAS, 14 to 28 km S and SSE Pto. Ayacucho, 119-135 m, (5); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (5). ZULIA, El Rosario, 42 km WNW Encontrados, 24 m, (1). Total 19.

Diphylla ecaudata Spix, 1823:68.

Northern Venezuela. Caught in mist nets (18 percent) and found roosting in caves (55 percent) and houses (27 percent); in moist (55 percent) or dry areas (45 percent); in evergreen forest (55 percent), orchards (27 percent), croplands (9 percent), and deciduous forest (9 percent); 1-1,537 m; bms-T (3), bs-T (1), bh-P (6), and bmh-P (1).

Specimens collected: CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (1). MONAGAS, 3 km SW Caripe, 854 m, (5); nr. San Agustín, 3 km NW Caripe, 1,185 m, (1). SUCRE, 21 km E Cumaná, 1 m, (3). TRUJILLO, 23 km N Valera, 164 m, (1). Total 11.

Family NATALIDAE

Natalus timidirostris Miller, 1900b:160.

Scattered lowland localities in northwestern and central Venezuela. Found mostly in caverns, both dry and wet (93 percent), but also netted over streams and ponds (7 percent); in dry sites (74 percent) or less often in moist sites (26 percent); in deciduous (77 percent) or thorn forest (15 percent) and occasionally in swamps (6 percent), evergreen forest (1 percent), and cropland (1 percent); 50-548 m; bms-T (28), bs-T (145), and bh-P (2).

Specimens collected: BOLÍVAR, Hato La Florida, 47 km SE Caicara, 50 m, (11). FALCÓN, 11 km ENE Mirimire, 250 m, (2); Peninsula de Paraguaná, 7 km W Pueblo Nuevo, 120 m, (27). LARA, Caserio Boro, 10 km N El Tocuyo, 521 m, (1). MIRANDA, Cueva Ricardo Zuloaga, nr. El Encantado, 15 km SE Caracas, 548 m, (134). Total 175.

Family FURIPTERIDAE

Furipterus horrens F. Cuvier, 1828:155.

T. F. Amazonas. Captured in mist nets (83 percent) and by hand in a house at dusk (17 percent); near streams and in other moist areas (100 percent); in evergreen forest (33 percent) and yards (67 percent); 130-150 m; bh-T (5) and bmh-T (1).

Specimens collected: T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); 32 km S Pto. Ayacucho, 135 m, (1); Tamatama, Río Orinoco, 135 m, (3). Total 6.

Family THYROPTERIDAE

Thyroptera tricolor Spix, 1823:61.

Southern Venezuela. Found roosting in rolled *Heliconia* leaves (73 percent) or caught in mist nets (27 percent); near streams and in other moist areas (100 percent); in evergreen forest (82 percent) and openings such as orchards (18 percent); 130-851 m; bs-T (9), bh-T (1), and bmh-P (1).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); 45 km NE Icabarú, 851 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (8). Total 11.

Family VESPERTILIONIDAE

Myotis albescens E. Geoffroy, 1806b:204.

Scattered localities throughout Venezuela, particularly in southern and western sectors. Netted (59 percent) or trapped (19 percent), hand caught in roosts in rocks (16 percent) and in a hollow tree (1 percent), and shot in flight (5 percent); over or near streams and lagoons and in other moist areas (99 percent), or rarely in dry sites (1 percent); in evergreen forest (52 percent), openings such as yards, pastures, and croplands (37 percent), and swamps or marshes (11 percent); 1-155 m; bs-T (24), bh-T (49), bmh-T (12), and bh-P (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (5); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (13). BOLÍVAR, Río Supamo, 50 km

SE El Manteco, 150 m, (1). MIRANDA, 5 to 10 km E and ESE Río Chico, 1 m, (10). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (7); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (2); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (8); 25 km SSW Pto. Ayacucho, 114 m, (8); Río Mavaca, 108 km SSE Esmeralda, 140 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (28). TRUJILLO, 23 km NNW Valera, 90 m, (1). ZULIA, El Rosario, 42 km WNW Encontrados, 24 m, (1). Total 86.

Myotis keaysi J. A. Allen, 1914:383.

Sierra de la Costa, northern Venezuela. Caught in mist nets (100 percent); over streams and in other moist areas (100 percent); in evergreen forest (mostly in yards and orchards, 96 percent), or in deciduous (2 percent) and cloud forest (2 percent); 630-2,092 m (96 percent above 1,000 m); bs-T (1), bh-P (8), bmh-P (43), and bh-MB (3).

Specimens collected: ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,081-1,100 m, (41). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (2). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,400-1,507 m, (2); Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,092 m, (1). GUÁRICO, Hda. Elvira, 10 km NE Altagracia, 630 m, (1). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160-1,180 m, (6); San Andrés, 16 km SSE Caracas, 950-1,144 m, (2). Total 55.

Myotis larensis LaVal, 1973:44.

Deserts around the Golfo de Venezuela. Found roosting in tree holes and in houses (65 percent) or caught in mist nets (35 percent); usually in dry sites (92 percent) but occasionally near streams (8 percent); in thorn forest (92 percent) or in clearings (8 percent); 5-55 m; me-T (26).

Specimens collected: FALCÓN, Capatárida and 6 km SSW Capatárida, 40-55 m, (25). ZULIA, nr. Cojoro, 35 km NNE Paraguaipoa, 5 m, (1). Total 26.

Myotis nigricans Schinz, 1821:179.

Widespread in the more humid portions of Venezuela. Caught in mist nets (74 percent) or bat traps (1 percent), with insect nets from roosts in houses (21 percent), and by hand in houses and hollow trees (4 percent); near streams and in other moist areas (74 percent), or in dry sites (26 percent); mostly in houses or yards and orchards (84 percent), but also in evergreen forest (9 percent), pastures (5 percent), and in swamps (2 percent); 18-2,240 m (97 percent below 1,200 m); bs-T (102), bh-T (7), bmh-T (3), bh-P (37), bh-MB (3), and bmh-MB (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2); Pto. Páez, 76 m, (2); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (1); San Fernando de Apure, 25 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Río Supamo, 50 km SE El Manteco, 150 m, (1). DTO. FEDERAL, Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,092-2,240 m, (4). GUÁRICO, Est. Biol. de los Llanos, 14 km SE Calabozo, 100 m, (2). MIRANDA, Curupao, 5 km NNW Guarenas, 1,180 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1); nr. San Agustín, 3 km NW Caripe, 1,190 m, (34). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (2); 25 to 32 km S Pto. Ayacucho, 114-135 m, (4). YARACUY, Minas de Aroa, 20 km NW San Felipe, 400 m, (1). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (1). CARABOBO and YARACUY, 6 to 11 km NW Urama, 25-60 m, (94). Total 153.

Myotis oxyotus Peters, 1866a:19.

Andes, Sierra de la Costa, and mountains of the Guiana region. Mist netted (56 percent) and caught at roosts in a cave (22 percent), house (11 percent), and house roof (11 percent); near streams and in other moist areas (89 percent), or in dry habitats (11 percent); in evergreen forest (78 percent) and in openings such as yards and orchards (22 percent); 800-2,110 m; bh-P (2), bmh-P (2), bp-P (1), bh-MB (2), and bmh-MB (2).

Specimens collected: BOLÍVAR, 21 km NE Icabarú, 851 m, (2); Km 125, 85 km SSE El Dorado, 826-1,032 m, (2). MÉRIDA, 4 km E Tabay, 2,107-2,110 m, (2). T. F. AMAZONAS, Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 800 m, (1). DTO. FEDERAL and MIRANDA, Alto Ño León, 33 km WSW Caracas, 1,665-1,950 m, (2). Total 9.

Myotis riparius Handley, 1960:466.

Central and southern Venezuela. Netted (89 percent) and trapped (11 percent); near streams and in other moist areas (58 percent), or in dry sites (42 percent); in croplands, orchards, and yards (58 percent), and in evergreen forest (42 percent); 24-1,070 m (90 percent below 200 m): bh-T (8), bmh-T (7), bh-P (2), and bmh-P (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (7). BARINAS, 7 km NNE Altamira, 1,070 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); 45 km NE Icabarú, 851 m, (1); Río Supamo, 50 km SE El Manteco, 150 m, (2). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (2); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); Tamatama, Río Orinoco, 135 m, (3). Total 19.

Myotis sp. ?

Specimen collected: DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380 m, (1). Total 1.

Eptesicus andinus J. A. Allen, 1914:382.

Humid low and middle elevations in mountains of northern Venezuela and in Bolívar. Caught in mist nets (100 percent); near streams and in other moist areas (75 percent), or in dry sites (25 percent); in evergreen forest (92 percent) and in openings such as yards (8 percent); 54-1,260 m; bh-T (2), bh-P (1), bmh-P (9), and bmh-MB (1).

Specimens collected: BARINAS, Altamira to 2 km SW Altamira, 611-794 m, (5). BOLÍVAR, Km 125, 85 km SSE El Dorado, 882 m, (4). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260 m, (1). MONAGAS, nr. San Agustín, 3 km NW Caripe, 1,170 m, (1). ZULIA, El Rosario, 48 to 63 km WNW Encontrados, 54-125 m, (2). Total 13.

Eptesicus brasiliensis Desmarest, 1819b:478.

Scattered localities east of the Andes, mostly south of the Río Orinoco. Caught in mist nets (53 percent), and by hand from holes in snags standing in lagoons (41 percent), and by hand in houses (6 percent); near streams and in other moist sites (94 percent), or in drier situations (6 percent); in yards (47 percent), evergreen forest (38 percent), and swamps, savanna, and orchards (15 percent); 18-380 m; bs-T (2), bh-T (60), bmh-T (1), and bh-P (1).

Specimens collected: BOLÍVAR, El Manaco, 59 to 67 km SE El Dorado, 150 m, (3). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (2). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (5); 25 to 33 km SSW Pto. Ayacucho, 144-195 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (28); Tamatama, Río Orinoco, 135 m, (22). Total 64.

Eptesicus dimidiatus Osgood, 1915:197.

Llanos of central Venezuela. Mist netted in a yard in dry, mixed grassland and deciduous scrub; 100 m; bs-T (2).

Specimens collected: GUÁRICO, Est. Biol. de los Llanos, 9 km SE Calabozo, 100 m, (2). Total 2.

Eptesicus furinalis d'Orbigny and Gervais, 1847: 13.

Widely scattered localities east of the Andes. Caught in mist nets (81 percent) and by hand in holes in trees (13 percent) and logs (6 percent); over or near streams and in other moist sites (80 percent), or in dry places (20 percent); in yards (38 percent), evergreen forest (25 percent), and savanna, swamps, and orchards (37 percent, in descending order of frequency); 1-1,160 m; bs-T (6), bh-T (7), bmh-T (1), and bh-P (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). BOLÍVAR, Hato San José, 20 km W La Paragua, 300 m, (1). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160 m, (1); nr. El Encantado, 13 km SE Caracas, 570 m, (2); 7 km E Río Chico, 1 m, (1); San Andrés, 16 km SSE Caracas, 950 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (4); Tamatama, Río Orinoco, 135 m, (1). FALCÓN and YARACUY, 10 to 19 km NW Urama, 25 m, (3). Total 16.

Eptesicus fuscus Palisot de Beauvois, 1796:18.

Mountains of northern Venezuela. Mist netted (100 percent); beside streams and in other moist areas (100 percent); in evergreen (75 percent) and cloud forest (25 percent); 1,260-1,524 m; bh-MB (3) and bmh-MB (1).

Specimens collected: DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,498-1,524 m, (3). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260 m, (1). Total 4.

Eptesicus montosus Thomas, 1920a:363.

Mountains of Bolívar and northern Venezuela. Netted (100 percent); over and near streams and in other moist areas (100 percent); in evergreen forest (74 percent), yards in forest openings (23 percent), and cloud forest (3 percent); 1,165-1,581 m; bmh-P (6), bh-MB (29), and bmh-MB (1).

Specimens collected: BOLÍVAR, Km 125, 85 km SSE El Dorado, 1,165 m, (1). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (5). DTO. FEDERAL, Los Venados, 4 km

NNW Caracas, 1,400-1,581 m, (29). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260 m, (1). Total 36.

Eptesicus sp. ?

Specimen collected: MIRANDA, San Andrés, 16 km SSE Caracas, 1,144 m, (1). Total 1.

Histiotus sp. A.

Sierra de la Costa. Netted (100 percent); in moist evergreen forest (within the forest, 50 percent, and in a livestock pen where the underbrush had been cleared, 50 percent); 1,498-2,101 m; bh-MB (4).

Specimens collected: DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,498 m, (2); Pico Ávila, 5 km NNE Caracas, 2,092-2,101 m, (2). Total 4.

Remarks: For notes on the systematics and nomenclature of this species, see Handley (in press).

Rhogeessa minutilla Miller, 1897:139.

Arid lowlands of northern Venezuela. Found roosting in hollow trees (84 percent), in houses (3 percent), and in a crevice in the ground (less than 1 percent), mist netted (12 percent), and shot in flight (1 percent); in dry (96 percent) or moist sites (4 percent); in thorn forest (96 percent) and in a yard in a forest opening (4 percent); 10-592 m; me-T (123), bms-T (99), and me-P (3).

Specimens collected: FALCÓN, Capatárida to 6 km SSW Capatárida, 40-55 m, (108). LARA, Caserio Boro, 10 km NE, N, and NW El Tocuyo, 518-537 m, (99); La Concordia, 47 km NE El Tocuyo, 592 m, (3). NUEVA ESPARTA, Isla Margarita, 31 km W Porlamar, 10 m, (1). ZULIA, nr. Cojoro, 34 to 37 km NNE Paraguaipoa, 10-15 m, (14). Total 225.

Rhogeessa tumida H. Allen, 1866:286.

Humid lowlands of northern Venezuela and middle reaches of the Río Orinoco. Caught in mist nets (88 percent) and with insect nets (12 percent); over and near streams and in other moist areas (63 percent), or in dry sites (37 percent); in pasture and prairie (39 percent), evergreen forest (26 percent), yards (22 percent), and in deciduous, thorn, and swamp forest (13 percent); 1-570 m; bs-T (14), bh-T (7), bs-P (1), and bh-P (3).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 km NE Pto. Páez, 76 m, (2); 1 km W Pto. Páez, 76 m, (1). FALCÓN, 19 km NW Urama, 25 m, (5). MIRANDA, nr. El Encantado, 13 km SE Caracas, 570 m, (1); Río Chico and 1 to 7 km E Río Chico, 1 m, (3). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (5). SUCRE, Manacal, 26 km ESE Carúpano, 170 m, (1). T. F. AMAZONAS, 65 km SSW Pto. Ayacucho, 161 m, (1). TRUJILLO, 25 km NW Valera, 90 m, (1). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-400 m, (3). ZULIA, El Rosario, 39 to 48 km WNW Encontrados, 37-54 m, (2). Total 25.

Lasiurus borealis Müller, 1776:20.

Scattered humid lowland localities in T. F. Amazonas and western Venezuela. Netted (86 percent) and trapped (14 percent); near streams and in other moist areas (100 percent); in evergreen forest (71 percent) and forest openings such as pastures and yards (29 percent); 24-155 m; bs-T (1), bh-T (4), and bmh-T (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). ZULIA, El Rosario, 57 km WNW Encontrados, 61 m, (1). CARABOBO and FALCÓN, 10 to 19 km NW Urama, 25 m, (2). Total 7.

Lasiurus cinereus Palisot de Beauvois, 1796:18.

In a wide variety of habitats at scattered localities in northern Venezuela. Caught in mist nets (88 percent) and found hanging in foliage in a tree (12 percent); over or near streams and in other moist areas (88 percent), or in dry areas (12 percent); in evergreen forest (50 percent), thorn forest (25 percent), cloud forest (12.5 percent), and cropland (12.5 percent); 40-1,465 m; me-T (1), me-P (1), bh-P (2), and bh-MB (4).

Specimens collected: DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (2); Los Venados, 4 km NNW Caracas, 1,400-1,465 m, (4). FALCÓN, Capatárida, 40 m, (1). LARA, La Concordia, 47 km NE El Tocuyo, 592 m, (1). Total 8.

Lasiurus ega Gervais, 1856:73.

Scattered localities in northern and southern Venezuela. Caught in mist nets (53 percent) or shot in flight (47 percent); over or near streams and in other moist areas (100 percent); in yards and in savanna or pasture (68 percent) or in evergreen forest (32 percent); 1-851 m (90 percent below 500 m); bs-T (9), bh-T (8), and bh-P (2).

Specimens collected: BOLÍVAR, Icabarú to 21 km NE Icabarú, 473-851 m, (3). MIRANDA, 1 km S Río Chico, 1 m, (1). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (8). CARABOBO and YARACUY, 10 km NW Urama, 25 m, (7). Total 19.

Family MOLOSSIDAE

Molossops abrasus Temminck, 1826:232.

Bolívar. Caught in a mist net beside a pond in a clearing in mature evergreen forest; 150 m; bh-T (2).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (2). Total 2.

Molossops greenhalli Goodwin, 1958:3.

Bolívar. Netted over a pond in a clearing in evergreen forest; 150 m; bh-T (1).

Specimen collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1). Total 1.

Molossops paranus Thomas, 1901c:190.

Bolívar and Yaracuy. Netted beside a pond in a clearing in evergreen forest and over a stream in a pasture; 25-150 m; bs-T (1) and bh-T (1).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1). YARACUY, 10 km NW Urama, 25 m, (1). Total 2.

Molossops planirostris Peters, 1865c:575.

Llanos and savannas of central Venezuela. Caught in roosts in rotting snags (98 percent) and in the attic of a house (2 percent), or mist netted (less than 1 percent); in seasonal lagoons, near streams, and in other moist places (100 percent); in swamps (94 percent), yards (5 percent), and evergreen forest (1 percent); 18-155 m; bs-T (13) and bh-T (228).

Specimens collected: APURE, San Fernando de Apure, 25 m, (4). BOLÍVAR, Hato La Florida, 47 km ESE Caicara, 50 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (8). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (228). Total 241.

Molossops sp. ?

Specimen collected: DTO. FEDERAL, Caracas, 857 m, (1). Total 1.

Neoplatymops mattogrossensis Vieira, 1942:430.

Central Venezuela. Hand caught from roosts in narrow crevices under rocks (67 percent) or mist netted (28 percent) or shot (5 percent) near such roosts; usually near streams and in other moist areas (83 percent), but sometimes in hot, dry sites (17 percent); in evergreen forest (78 percent) and in prairie (22 percent); 76-195 m; bs-T (16) and bh-P (2).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 km NE Pto. Páez, 76 m, (3). BOLÍVAR, Los Patos, 28 km SE El Manteco, 150 m, (2). T. F. AMAZONAS, 20 to 33 km S Pto. Ayacucho, 135-195 m, (13). Total 18.

Tadarida brasiliensis I. Geoffroy, 1824:343.

Andes. Caught at roosts in houses (63 percent), or mist netted (37 percent); near streams (100 percent); in orchards (63 percent) and yards (37 percent); 2,107 m; bh-MB (8).

Specimens collected: MÉRIDA, 4 km E Tabay, 2,107 m, (8). Total 8.

Tadarida gracilis Wagner, 1843a:368.

At low elevations in Yaracuy and southern Venezuela. Found roosting in rocks (97 percent) and houses (1 percent) or mist netted (2 percent); over or near streams (58 percent) and in other moist sites (19 percent), or in dry areas (23 percent); in savanna and pasture (52 percent), evergreen forest (47 percent), and in orchards and yards (1 percent); 25-350 m; bs-T (81), bh-T (67), bmh-T (69), and bh-P (3).

Specimens collected: APURE, 1 km W Pto. Páez, 76 m, (50); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (28). BOLÍVAR, Río Supamo, 50 km SE El Manteco, 150-350 m, (3). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (69); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (67). YARACUY, 10 km NW Urama, 25 m, (3). Total 220.

Tadarida laticaudata E. Geoffroy, 1805:156.

Bolívar. Mist netted beside a pond in evergreen forest; 150 m; bh-T (2).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (2). Total 2.

Eumops amazonicus Handley, 1955:177.

Bolívar and T. F. Amazonas. Netted over a pond in a large clearing in evergreen forest and taken from a roost in a hole in a dead snag standing in a large lagoon; 150-155 m; bh-T (2).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 2.

Eumops auripendulus Shaw, 1800:137.

Llanos and Península de Falcón. Netted over and adjacent to streams in a pasture and in a savanna; 25-100 m; bs-T (5).

Specimens collected: APURE, San Rafael de Atamaica, 42 km SSE San Fernando de Apure, 100 m, (1). YARACUY, 10 km NW Urama, 25 m, (4). Total 5.

Eumops dabbenei Thomas, 1914:480.

Península de Falcón. Netted over a stream in a pasture; 25 m; bs-T (1).

Specimen collected: YARACUY, 10 km NW Urama, 25 m, (1). Total 1.

Eumops glaucinus Wagner, 1843a:368.

T. F. Amazonas and base of Península de Falcón. Taken from roosts in trees (83 percent) and houses (7 percent) and netted (10 percent); over or near streams, swamps, and lagoons (89 percent), or in dry areas (11) percent); in swamp forest (51 percent), evergreen forest (32 percent), and in yards (17 percent); 155-598 m (93 percent below 500 m); bh-T (68), bs-P (6), and bh-P (7).

Specimens collected: CARABOBO, Montalbán, 598 m, (6). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (68). YARACUY, Minas de Aroa, 20 km NW San Felipe, 395-400 m, (7). Total 81.

Eumops nanus Miller, 1900c:471.

Arid borders of Golfo de Venezuela. Netted over a small pond in thorn forest (47 percent) and taken from a roost in a tree hole in thorn forest (53 percent); 15-40 m; me-T (17).

Specimens collected: FALCÓN, Capatárida, 40 m, (9). GUAJIRA, nr. Cojoro, 37 km NNE Paraguaipoa, 15 m, (8). Total 17.

Eumops sp. ?

Specimen collected: DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (1). Total 1.

Molossus ater E. Geoffroy, 1805:279[=379].

North-central, northeastern, and southern Venezuela. Caught in nets (60 percent) or at roosts in hollow trees (38 percent), houses (2 percent), and in hollow logs and in rocks (less than 1 percent); usually near streams and in other moist places (68 percent), but often in dry sites (32 percent); in open places such as yards, pastures, and orchards (45 percent), swamps (32 percent), evergreen forest (22 percent), and thorn and cloud forest (1 percent); 1-1,180 m (85 percent below 500 m); bms-T (46), bs-T (177), bh-T (114), bmh-T (12), bs-P (2), and bh-P (59).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (30); Pto. Páez, 76 m, (25). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (10). CARABOBO, Montalbán, 155-598 m, (3). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (1). MIRANDA, Birongo, 60 m, (1). MONAGAS, San Agustín, 3 to 5 km NW Caripe, 1,160-1,180 m, (57). SUCRE, 14 to 21 km E Cumaná, 1-15 m, (46); Ensenada Cauranta, 9 km NE Güiria, 1 m, (2); San Fernando, 16 km SE Cumaná, 300 m, (118). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (10); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); 20 to 65 km S and SSW Pto. Ayacucho, 135-161 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (102). Total 410.

Molossus aztecus Saussure, 1860:285.

Lowlands of central and southern Venezuela. Found roosting in tree holes and rotting tree trunks (89 percent) and in houses (8 percent), or caught in nets (3 percent); usually over or near lagoons and other moist areas (99 percent), but rarely in dry sites (1 percent); in swamps (52 percent), evergreen forest (38 percent), and yards and pastures (10 percent); 25-155 m; bs-T (16) and bh-T (137).

Specimens collected: APURE, San Fernando de Apure, 25 m, (9). BOLÍVAR, Hato La Florida, 47 km ESE Caicara, 50 m, (3). GUÁRICO, Est. Biol. de los Llanos, 9 km SE Calabozo, 100 m, (2). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 36 m, (2). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (10); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (127). Total 153.

Molossus bondae J. A. Allen, 1904:228.

Northwestern Venezuela. Netted beside a stream in a pasture (90 percent) and found roosting in the thatched roof of a house in a dry upland area (10 percent); 25-578 m; bs-T (19) and bs-P (2).

Specimens collected: CARABOBO, Montalbán, 598 m, (2). CARABOBO and YARACUY, 10 km NW Urama, 25 m, (19). Total 21.

Molossus molossus Pallas, 1766:49.

At lower elevations throughout Venezuela, except in the basin of Lago de Maracaibo. Caught in mist nets (51 percent), hand caught from roosts in houses (16 percent), trees (1 percent), and rocks (less than 1 percent), and purchased (probably mostly from roosts in houses, 32 percent); usually near streams and in other moist areas (76 percent), but frequently in dry sites (24 percent); in openings such as yards, pastures, and croplands (61 percent), in evergreen (33 percent), cloud (3 percent), and thorn forest (2 percent), and in swamps (1 percent); 1-915 m; bms-T (52), bs-T (217), bh-T (23), bmh-T (4), bs-P (1), bh-P (38), and bmh-P (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1); 1 km W Pto. Páez, 76 m, (1); San Rafael de Atamaica, 42 km SSE San Fernando de Apure, 100 m, (3). BARINAS, Altamira, 620-

794 m, (2). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (12); Hato La Florida, 47 km ESE Caicara, 50 m, (7); Hato San José, 20 km W La Paragua, 300 m, (1); Icabarú, 473 m, (91). DTO. FEDERAL, Caracas, 915 m, (1); Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (13). FALCÓN, Península de Paraguaná, 9 to 15 km SSW Pueblo Nuevo, 55-120 m, (37); Riecito, 30 km S Mirimire, 300 m, (88). LARA, Caserio Boro, 10 km N El Tocuyo, 537 m, (14). MIRANDA, 7 km E and S Río Chico, 1 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (3). SUCRE, 14 km E Cumaná, 1 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (10). YARACUY, Minas de Aroa, 20 km NW San Felipe, 400 m, (25). CARABOBO and YARACUY, 10 to 11 km NW Urama, 25 m, (22). Total 337.

Molossus sinaloae J. A. Allen, 1906:236.

Northern Venezuela. Found roosting in houses (50 percent) and caught over streams in mist nets (50 percent); in evergreen forest (17 percent), forest openings (50 percent), and pasture (33 percent); 1-1,160 m; bs-T (5) and bh-P (1).

Specimens collected: MIRANDA, 1 km S Río Chico, 1 m, (3). MONAGAS, San Agustín, 5 km NW Caripe, 1,160 m, (1). YARACUY, 10 km NW Urama, 25 m, (2). Total 6.

Molossus sp. ?

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (3). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 380-398 m, (8). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (37). Total 48.

Promops centralis Thomas, 1915a:62.

Bolívar. Caught in a mist net over a stream in evergreen forest; 50 m; bs-T (1).

Specimen collected: BOLÍVAR, Hato La Florida, 47 km ESE Caicara, 50 m, (1). Total 1.

Promops nasutus Spix, 1823:60.

Bolívar and T. F. Amazonas. Roosting in a rotting tree in a swamp (75 percent) and netted at the edge of a clearing in evergreen forest (25 percent); 155-1,032 m; bh-T (3) and bmh-P (1).

Specimens collected: BOLÍVAR, Km 125, 85 km SSE El Dorado, 1,032 m, (1). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (3). Total 4.

Order PRIMATES

Family CEBIDAE

Aotus trivirgatus Humboldt, 1812:306.

T. F. Amazonas and basin of Lago de Maracaibo. In trees (100 percent); usually in evergreen forest (96 percent) but occasionally in deciduous forest (4 percent); in moist (56 percent) or dry areas (44 percent); 37-1,200 m (99 percent below 500 m); bs-T (2), bh-T (63), bmh-T (4), and bmh-P (11).

Specimens collected: TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (10). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (4); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (4); 14 km SSE Pto. Ayacucho, 135 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (19). TRUJILLO, 25 km NW Valera, 90 m, (2). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (1); El Rosario, 45 to 65 km WNW Encontrados, 37-95 m, (37); Novito, 19 km WSW Machiques, 1,200 m, (1). Total 80.

Callicebus torquatus Hoffmannsegg, 1807:86.

Southern T. F. Amazonas. In trees (100 percent); near streams and other moist areas (100 percent); in evergreen forest (100 percent); 130-150 m; bh-T (27) and bmh-T (4).

Specimens collected: T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (4); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (11); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (6); 7 km SE Esmeralda, 135 m, (2); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); Tamatama, Río Orinoco, 135 m, (7). Total 31.

Cacajao melanocephalus Humboldt, 1812:316.

Southern T. F. Amazonas. In trees (100 percent); near streams (100 percent); in evergreen forest (100 percent); 130-140 m; bh-T (15).

Specimens collected: T. F. AMAZONAS, Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (5); Río Mavaca, 108 km SSE Esmeralda, 140 m, (10). Total 15.

Pithecia pithecia Linnaeus, 1766:40.

Southern Venezuela. Found in trees (100 percent); in moist evergreen forest (93 percent) or in dry deciduous forest (7 percent); 150-350 m; bh-T (23), bmh-T (2), and bh-P (3).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (23); Los Patos, 25 km SE El Manteco, 350 m, (2); Río Supamo, 50 km SE El Manteco, 150 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2). Total 28.

Chiropotes satanas Hoffmannsegg, 1807:93.

Lowlands of T. F. Amazonas. In trees (100 percent); near streams (100 percent); in evergreen (80 percent) or deciduous forest (20 percent); 135-161 m; bh-T (51) and bmh-T (13).

Specimens collected: T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (13); Boca de Río Cunucunuma, 49 km W Esmeralda, 135 m, (2); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (20); 20 km SE Esmeralda, Río Orinoco, 135 m, (2); 70 km SSW Pto. Ayacucho, 161 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (5); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (19); Tamatama, Río Orinoco, 135 m, (2). Total 64.

Alouatta seniculus Linnaeus, 1766:37.

Forested lowlands of Venezuela. Usually near streams or other moist areas (69 percent) but frequently in dry places (31 percent); in the canopy of evergreen (80 percent) or deciduous forest (5 percent) or in scattered trees in savanna and orchards (15 percent); 18-800 m (95 percent below 500 m); bs-T (26), bh-T (54), bmh-T (12), bh-P (10), and bmh-P (1).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (5); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (9); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (1); Río Cinaruco, 48 km NW Pto. Páez, 76 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (6); Hato La Florida, 38 km SE Caicara, 50 m, (2); Hato San José, 20 km W La Paragua, 324 m, (5); 21 to 46 km NE Icabarú, 658-800 m, (5). FALCÓN, nr. La Pastora, 11 km ENE Mirimire, 250 m, (3); Río Socopito, 80 km NW Carora, 470 m, (3); 19 km NW Urama, 25 m, (2). GUÁRICO, Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (5). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (21); Tamatama, Río Orinoco, 135 m, (4). TRUJILLO, La Ceiba, 52 km WNW Valera, 29 m, (8); 25 km NW Valera, 90 m, (1). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (6); nr. Cerro Azul, 33 to 39 km NW La Paz, 75-80 m, (2); El Rosario, 45 to 51 km WNW Encontrados, 37-50 m, (9). Total 103.

Cebus albifrons Humboldt, 1812:324.

Lowlands and foothills SW and S of Lago de Maracaibo, head of Río Apure, and southern T. F. Amazonas. In forest canopy (100 percent); usually in dry upland areas (81 percent) but occasionally near streams (19 percent); in evergreen forest (100 percent); 24-460 m; bh-T (29), bmh-T (11), and bmh-P (8).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (11). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (8). T. F. AMAZONAS, Río Mavaca, 108 km SSE Esmeralda, 140 m, (5); Tamatama, Río Orinoco, 135 m, (1). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 75 m, (6); El Rosario, 45 to 51 km WNW Encontrados, 37-50 m, (17). Total 48.

Cebus apella Linnaeus, 1758:28.

Isla Margarita and southern T. F. Amazonas. In trees (100 percent); near streams in evergreen forest (75 percent) and in dry mountainside orchard (25 percent); 130-410 m; bh-T (8), bs-P (3), and bh-P (1).

Specimens collected: NUEVA ESPARTA, Isla Margarita, 3 km NE La Asunción, 305-410 m, (4). T. F. AMAZONAS, Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (2); Tamatama, Río Orinoco, 135 m, (6). Total 12.

Cebus nigrivittatus Wagner, 1848:430.

Widespread in T. F. Amazonas north and east of the Río Orinoco and in Bolívar; locally distributed in northern Venezuela. Found in trees (96 percent) and among rocks on cliff (4 percent); near streams and in other moist areas (78 percent) as well as in dry upland sites (22 percent); in evergreen (93 percent), cloud (1 percent), and deciduous forest (1 percent) and in savanna gallery forest (5 percent); 18-1,537 m (89 percent below 500 m); bs-T (19), bh-T (55), bmh-T (8), bh-P (18), bmh-P (3), bp-P (3), and bp-MB (3).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (1). BOLÍVAR, El Manaco, 56 to 59 km SE El Dorado, 150 m, (25); Hato La Florida, 45 km ESE Caicara, 58 m, (5); Hato San José, 20 to 32 km W and NW La Paragua, 300-324 m, (9); 19 to 46 km NE Icabarú, 658-800 m, (5); Los Patos, 25 km SE El Manteco, 350 m, (5); Río Supamo, 50 km SE El Manteco, 350 m, (10). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (1). FALCÓN, Riecito, 30 km S Mirimire, 300 m, (4); 10 km NW Urama, 25 m, (13). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (4). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (8); Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400 m, (3);

Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 825 m, (3); Esmeralda, Río Orinoco, 135 m, (2); 32 km S Pto. Ayacucho, 135 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (10). Total 109.

Cebus sp. ?

Specimens collected: T. F. AMAZONAS, Caño Cariche, Río Orinoco, 92 km W Esmeralda, 40 m, (1); Esmeralda, Río Orinoco, 135 m, (5). Total 6.

Saimiri sciureus Linnaeus, 1758:29.

Lowlands of T. F. Amazonas. In trees (100 percent); near streams (89 percent) and in other moist areas (11 percent); in evergreen forest (100 percent); 130-155 m; bh-T (50) and bmh-T (7).

Specimens collected: T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (7); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (4); Río Mavaca, 108 km SSE Esmeralda, 140 m, (9); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (24); Tamatama, Río Orinoco, 135 m, (12). Total 57.

Ateles belzebuth E. Geoffroy, 1806a:272.

T. F. Amazonas, upper Apure, and Maracaibo lowlands. In trees (100 percent); in dry uplands (52 percent) or near streams and other moist areas (48 percent); in evergreen (78 percent) or deciduous forest (22 percent); 24-155 m; bs-T (2), bh-T (75), and bmh-T (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (22); Río Mavaca, 108 km SSE Esmeralda, 140 m, (14); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (11); Tamatama, Río Orinoco, 135 m, (1). TRUJILLO, La Ceiba, 48 km WNW Valera, 28 m, (2). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (17); El Rosario, 45 to 51 km WNW Encontrados, 37-54 m, (10). Total 78.

Order EDENTATA

Family MYRMECOPHAGIDAE

Myrmecophaga tridactyla Linnaeus, 1758:35.

Lowlands of southern Venezuela. On the ground (100 percent); in dry savanna (57 percent) and in moist evergreen forest (43 percent); 65-310 m; bs-T (6), bh-T (1), and bmh-T (3).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (1). BOLÍVAR, Hato La Florida, 52 km ESE Caicara, 65 m, (1); Hato San José, 20 km W La Paragua, 300-310 m, (3); Río Cuchivero, nr. Caicara, 200 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 10.

Tamandua mexicana Saussure, 1860:9.

Lowlands south and west of Lago de Maracaibo. Found in trees (87 percent) or on the ground (13 percent); in dry habitats (65 percent) or near streams and other moist areas (35 percent); in evergreen forest (100 percent); 37-460 m; bh-T (16) and bmh-P (2).

Specimens collected: TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (2). ZULIA, El Rosario, 39 to 51 km WNW Encontrados 37-61 m, (16). Total 18.

Remarks: Reasons for separating *Tamandua mexicana* Saussure from *Tamandua tetradactyla* Linnaeus are in Wetzel (1975).

Tamandua tetradactyla Linnaeus, 1758:35.

Throughout the lowlands and foothills of Venezuela east of Lago de Maracaibo. Found in trees (64 percent), on the ground (24 percent), and dead on roads (12 percent); most often in dry areas (64 percent) but also near streams (23 percent) and in other moist areas (13 percent); in thorn (44 percent), evergreen (30 percent), and deciduous forest (5 percent), or in savannas and croplands (21 percent); 18-1,537 m (83 percent below 500 m); me-T (14), bms-T (14), bs-T (18), bh-T (9), bmh-T (3), bs-P (1), bh-P (4), and bmh-P (1).

Specimens collected: ANZOÁTEGUI, 20 km E Pto. Píritu, 27 m, (1). APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (2); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Hato La Florida, 45 km SE Caicara, 65 m, (1); Hato San José, 20 km W La Paragua, 297-324 m, (4); Icabarú, 473 m, (1); Los Patos, 25 km SE El Manteco, 350 m, (1); 25 km S Upata, 300 m, (1); 5 km SSW Upata, 300 m, (1). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (1); 2 to 9 km SE and NE Montalbán, 598-752 m, (2); 15 km SW Pto. Cabello, 50 m, (1). FALCÓN, Capatárida to 31 km WSW and SSE Capatárida, 40-100 m, (19); 15 to 18 km NE and ENE Mirimire, 75 m, (2); Riecito, 30 km S Mirimire, 300 m, (1). GUÁRICO, La Encrucijada, 18 km S El Sombrero, 200 m, (1). LARA, Caserio Boro, 10 km N El Tocuyo, 537 m, (7). MIRANDA, Parque Nac. Guatopo, 21 km NW Altagracia, 630 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (5). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca de Río Cunucunuma, 49 km W Esmeralda, 135 m, (2); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); 26 km S Pto. Ayacucho, 119 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (3). Total 64.

Cyclopes didactylus Linnaeus, 1758:35.

T. F. Amazonas. In trees (100 percent); near streams (100 percent); in evergreen forest (100 percent); 138-145 m; bh-T (2) and bmh-T (1).

Specimens collected: T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (2). Total 3.

Family BRADYPODIDAE

Bradypus tridactylus Linnaeus, 1758:34.

Bolívar. In trees (100 percent); in moist (67 percent) or dry sites (33 percent); in evergreen (67 percent) or deciduous forest (33 percent); 150-350 m; bh-T (2) and bh-P (4).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (2); Los Patos, 25 km SE El Manteco, 350 m, (2); Río Supamo, 50 km SE El Manteco, 150 m, (2). Total 6.

Bradypus variegatus Schinz, 1825:510.

Northern and western Venezuela and T. F. Amazonas. In trees (100 percent); in dry sites (63 percent) or near streams (37 percent); in evergreen forest (80 percent) or in scattered trees in pasture (20 percent); 24-1,144 m; bs-T (1), bh-T (4), and bh-P (3).

Specimens collected: MIRANDA, San Andrés, 16 km SSE Caracas, 1,144 m, (3). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (1). ZULIA, El Rosario, 42 to 51 km WNW Encontrados, 24-37 m, (2). CARABOBO and YARACUY, 10 km NW Urama, 25 m, (1). Total 8.

Remarks: For use of the name *Bradypus variegatus* Schinz, in place of the more familiar *Bradypus infuscatus* Wagler (1831:611), see Wetzel and Kock (1973:25).

Choloepus didactylus Linnaeus, 1758:35.

Southern Venezuela. In trees (100 percent); in moist (50 percent) or dry situations (50 percent); in evergreen (50 percent) or deciduous forest (50 percent); 150-350 m; bmh-T (3) and bh-P (1).

Specimens collected: BOLÍVAR, Los Patos, 25 km SE El Manteco, 350 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3). Total 4.

Choloepus hoffmanni Peters, 1858:128.

Lowlands and foothills west and south of Lago de Maracaibo. In trees (100 percent); in moist (75 percent) or dry situations (25 percent); in evergreen forest (75 percent) or orchard (25 percent); 24-460 m; bs-T (2), bh-T (2), and bmh-P (4).

Specimens collected: TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (4). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (2); El Rosario, 42 to 60 km WNW Encontrados, 24-73 m, (2). Total 8.

Family DASYPODIDAE

Priodontes maximus Kerr, 1792:112.

Central and southern Venezuela. On the ground (100 percent); in a dry area and near a stream; in evergreen forest and in cropland; 24-155 m; bh-T (1) and bmh-T (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 2.

Dasypus kappleri Krauss, 1862:24.

Bolívar and T. F. Amazonas. On the ground (100 percent); in moist areas (100 percent); in evergreen forest (100 percent); 150-658 m; bh-T (1), bmh-T (2), and bh-P (2).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); 19 km NE Icabarú, 658 m, (1); Río Supamo, 50 km SE El Manteco, 350 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2). Total 5.

Dasypus novemcinctus Linnaeus, 1758:51.

At lower elevations throughout Venezuela, except in the driest areas. On the ground (100 percent); in moist (72 percent) or dry areas (28 percent); in savanna, pasture, croplands, and orchards (44 percent), in evergreen (44 percent) and cloud forest (4 percent), and in deciduous and thorn forest (8 percent); 18-1,537 m; bms-T (4), bs-T (18), bh-T (14), bmh-T (5), bs-P (2), bh-P (7), and bmh-P (4).

Specimens collected: ANZOÁTEGUI, 14 km W Clarines, 100 m, (2). APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2). BOLÍVAR, Hato La Florida, 52 km ESE Caicara, 65 m, (1); Hato San José, 20 km W La Paragua, 324 m, (1). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (2); La Trinidad, 9 km NW Montalbán, 900 m, (3); Montalbán, 598 m, (2). FALCÓN, nr. Mirimire, 250 m, (1). LARA, Caserio Boro, 10 km N El Tocuyo, 537 m, (2). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160 m, (1); Tácata, 35 km SW Caracas, 366 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (14). SUCRE, Ensenada Cuaranta, 12 km NE Güiria, 90 m, (2). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (2). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); 32 km S Pto. Ayacucho, 135 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (6). TRUJILLO, La Ceiba, 48 km WNW Valera, 28 m, (1); 30 km NW Valera, 90 m, (1). ZULIA, El Rosario, 45 to 51 km WNW Encontrados, 37 m, (3); Kasmera, 21 km SW Machiques, 270 m, (1); Río Negro, 8 km W Machiques, 250 m, (1). Total 54.

Dasypus sabanicola Mondolfi, 1968:151.

Llanos of Apure. Taken on the ground in dry prairie; 76 m; bs-T (2).

Specimens collected: APURE, 1 km W Pto. Páez, 76 m, (2). Total 2.

Order LAGOMORPHA

Family LEPORIDAE

Sylvilagus brasiliensis Linnaeus, 1758:58.

Scattered localities in central and northern Venezuela. On the ground (100 percent); usually near streams and in other moist areas (80 percent) or occasionally in dry areas (20 percent); in evergreen forest (75 percent) and in yards or pastures (25 percent); 24-1,524 m; bs-T (2), bmh-T (2), and bh-MB (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2). BOLÍVAR, Hato San José, 20 km W La Paragua, 300 m, (2). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,624 m, (1). Total 5.

Sylvilagus floridanus J. A. Allen, 1890:160.

Lowlands north of the Río Orinoco. On the ground (100 percent); in dry upland sites (97 percent) or rarely in moist places (3 percent); in thorn forest (76 percent), savannas and pastures (20 percent), and orchards and deciduous forest (4 percent); 10-598 m; me-T (22), bms-T (89), bs-T (30), and bs-P (1).

Specimens collected: ANZOÁTEGUI, 14 km W Clarines, 100 m, (35). APURE, Hato Cariben, Río Cinaruco, 32 to 46 km NE Pto. Páez, 76 m, (11); Pto. Páez to 38 km NNW Pto. Páez, 76 m, (1); Río Cinaruco, 65 km NW Pto. Páez, 76 m, (1). CARABOBO, Montalbán, 598 m, (1). FALCÓN, Capatárida to 18 km SSW and WSW Capatárida, 30-75 m, (23); Península de Paraguaná, 15 km SSW Pueblo Nuevo, 45-55 m, (34). GUÁRICO, Hda. Los Mamones, 16 km NW Barbacoas, 228 m, (3). LARA, Caserio Boro, 10 km N El Tocuyo, 537 m, (10). MONAGAS, Hato Mata de Bejuco, 55 km, SSE Maturín, 18 m, (14). NUEVA ESPARTA, Isla Margarita, 3 km NNE La Asunción, 38-60 m, (7); 36 km W Porlamar, 10 m, (1). ZULIA, nr. Cojoro, 34 km NNE Paraguaipoa, 10 m, (1). Total 142.

Order RODENTIA

Suborder SCIUROMORPHA

Family SCIURIDAE

Sciurus aestuans Linnaeus, 1766:88.

Bolívar and mountains of T. F. Amazonas. Found in trees (100 percent); near streams and in other moist areas (100 percent); in evergreen forest (100 percent); 150-1,400 m; bh-T (2), bh-P (2), and bp-MB (2).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (2); 28 km NE Icabarú, 775 m, (2). T. F. AMAZONAS, Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1400 m, (2). Total 6.

Sciurus gilvigularis Wagner, 1843b:43.

Lowlands of T. F. Amazonas. Found in trees (100 percent); near streams and other moist areas (100 percent); in evergreen forest (100 percent); 135-155 m; bh-T (10).

Specimens collected: T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (5); 32 km S Pto. Ayacucho, 135 m, (2); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2). Total 10.

Sciurus granatensis Humboldt, 1805:8 and 13.

Forested portions of northern and western Venezuela. Collected in trees (99 percent) or rarely on the ground (1 percent); near streams and other moist areas (73 percent) or in dry habitats (27 percent); in evergreen (62 percent), cloud (7 percent), deciduous (1 percent), and thorn forest (1 percent), and in forest openings such as yards (15 percent), orchards (10 percent), and croplands and pastures (4 percent); 1-2,400 m (93 percent below 1,500 m); bms-T (1), bs-T (9), bh-T (23), bmh-T (9), bs-P (22), bh-P (31), bmh-P (71), bh-MB (1), bmh-MB (10), and p-SA (1).

Specimens collected: ANZOÁTEGUI, 14 km W Clarines, 100 m, (1). APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (9). BARINAS, Altamira to 1 km E Altamira, 600-794 m, (44). CARABOBO, La Copa, 4 km NW Montalbán, 1,500-1,513 m, (3); Montalbán to 9 km NW, NNW, and SE Montalbán, 598-1,000 m, (24). DTO. FEDERAL, Alto Ño León, 33 km WSW Caracas, 1,740 m, (1); Los Venados, 4 km NNW Caracas, 1,465 m, (1). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260 m, (1); 14 km ENE Mirimire, 150 m, (1); Riecito, 30 km S Mirimire, 300 m, (1); 19 km NW Urama, 25 m, (1). GUÁRICO, Hda. Elvira, 10 km NE Altagracia, 630 m, (1); Hda. Los Mamones, 16 km NW Barbacoas, 228 m, (1); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (1). MÉRIDA, La Carbonera, 12 km SE La Azulita, 2,170-2,180 m, (4); Paramito, 3 km W Timotes, 2,290 m, (1). MIRANDA, Curupao, 5 km NNW Guarenas, 1,140-1,160 m (5); 6 km SSE Río Chico, 1 m, (1); San Andrés, 16 km SSE Caracas, 1,144 m, (2). MONAGAS, nr. San Agustín, 2 to 5 km NW Caripe, 1 120-1,180 m, (18). NUEVA ESPARTA, Isla Margarita, 3 km NE La Asunción, 350 m, (1). SUCRE, Manacal, 26 km ESE Carúpano, 200-575 m, (4). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,350-2,400 m, (4); Las Mesas, 17 km NE San Juan de Colón, 300-460 m, (22). ZULIA, Boca del Río de Oro, 60 km WNW Encontrados, 73 m, (3); nr. Cerro Azul, 33 km La Paz, 75 m, (2); El Rosario, 45 to 51 km WNW Encontrados, 37-50 m, (19); Novito, 19 km WSW Machiques, 1,135-1,165 m, (2). Total 178.

Sciurus igniventris Wagner, 1842:360.

Lowland forests of southern Venezuela. Found in trees (100 percent); near streams and other moist areas (100 percent); in evergreen forest (100 percent); 130-658 m; bh-T (22), bmh-T (7), and bh-P (3).

Specimens collected: BOLÍVAR, 19 km NE Icabarú, 658 m, (3). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (2); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (5); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (9); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); Pto. Ayacucho to 70 km SSW Pto. Ayacucho, 135 m, (1); Río Mavaca, 108 km SSE Esmeralda, 140 m, (4); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (5); Tamatama, Río Orinoco, 135 m, (2). Total 32.

Family HETEROMYIDAE

Heteromys anomalus Thompson, 1815:161.

Northern Venezuela. Caught on the ground (41 percent), often near tree bases (35 percent), logs (14 percent) and boulders (10 percent); in moist areas and near streams (93 percent) or occasionally in dry areas (7 percent); in evergreen forest (84 percent), in openings such as grasslands, croplands, orchards, and yards (11 percent), and occasionally in cloud forest and deciduous forest (5 percent); 7-2,223 m (54 percent below 500 m); bs-T (33), bh-T (28), bs-P (14), bh-P (102), bmh-P (9), bh-MB (7), and bmh-MB (55).

Specimens collected: ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,050 m, (4). BARINAS, Altamira, 697-900 m, (5). CARABOBO, Montalbán, 562 m, (1). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (3). FALCÓN, 14 km ENE Mirimire, 150-170 m, (2); Río Socopito, 80 km NW Carora, 470-480 m, (27); 19 km NW Urama, 25 m, (6). MIRANDA, Alto Ño León, 31 to 36 km WSW Caracas, 31-33 m, (9); 3 km NE Caracas, 1,130-1,170 m, (2); Curupao, 5 km NNW Guarenas, 1,160-1,190 m, (5); Pico Ávila, 5 km NNE and 6 km NNW Caracas, 1,982-2,223 m, (53); San Andrés, 16 km SSE Caracas, 1,144 m, (1). MONAGAS, Cueva del Guácharo, 5 km W Caripe, 1,010 m, (2); San Agustín, 3 to 5 km NW Caripe, 1,170-1,335 m, (10). NUEVA ESPARTA, Isla Margarita, 3 to 4 km NE La Asunción, 100-420 m, (3). SUCRE, Ensenada Cauranta, 9 to 11 km NE Güiria, 7-45 m, (4); Manacal, 26 km ESE Carúpano, 175-575 m, (55). TRUJILLO, La Ceiba, 48 km WNW Valera, 28 m, (2); 12 to 30 km N, NW, NNW, and WNW Valera, 90-930 m, (26). YARACUY, Minas de Aroa, 20 km NW San Felipe, 407 m, (1). ZULIA, nr. Cerro Azul, 35 to 40 km NW La Paz, 80 m, (4); El Rosario, 45 to 48 km WNW Encontrados, 37-54 m, (7); Kasmera, 21 km SW Machiques, 270-273 m, (11). GUÁRICO and MIRANDA, Parque Nac. Guatopo, 15 to 21 km NW Altagracia, 640-720 m, (5). Total 248.

Heteromys sp. A.

Península de Paraguaná. Caught on the ground beside logs (40 percent) and at the bases of trees (60 percent); near streams and in other moist places (100 percent); in cloud forest (83 percent) and in thorn forest (17 percent); 90-615 m; bms-T (1) and bmh-P (5).

Specimens collected: FALCÓN, Cerro Santa

Ana, Península de Paraguaná, 15 km SSW Pueblo Nuevo, 550-615 m, (5); nr. Moruy, Península de Paraguaná, 15 km SSW Pueblo Nuevo, 90 m, (1). Total 6.

Remarks: A single juvenile specimen from Guárico, Hato Los Leones, Caño Agua Fría, 23 km NE Calabozo, 89 m, has tiny feet and the dusky color of forearm and flanks discontinuous, as in *Heteromys* sp. A, and it is tentatively assigned to that species. This is the only specimen of *Heteromys* that we have from the Llanos. If it is correctly associated with *Heteromys* sp. A, it indicates for that species a discontinuous geographic distribution similar to that of *Calomys hummelincki*. For notes on the systematics and nomenclature of *Heteromys* sp. A, see Handley (in press).

Suborder MYOMORPHA

Family MURIDAE

Subfamily CRICETINAE

Oryzomys albigularis Tomes, 1860b:264.

Andes and Sierra de la Costa. Caught on the ground, often at the base of trees, logs, and rocks (98 percent), or rarely on logs (2 percent); in moist areas (97 percent) or rarely in dry areas (3 percent); in cloud forest (63 percent), evergreen forest (27 percent), yards and croplands (8 percent), and deciduous forest (2 percent); 1,050-3,080 m (98 percent between 1,000 and 2,500 m); bs-P (7), bh-P (3), bmh-P (21), bh-MB (57), bmh-MB (121), and bp-M (3).

Specimens collected: ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,050-1,100 m, (21). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,418-1,661 m, (24). MÉRIDA, La Carbonera, 12 km SE La Azulita, 2,190 m, (1); Santa Rosa, 2 km N Mérida, 1,965-2,025 m, (23); 6 to 7 km ESE and SE Tabay, 2,550-3,080 m, (3). MIRANDA, 3 km NE Caracas, 1,110-1,175 m, (7); Curupao, 5 km NNW Guarenas, 1,160 m, (3). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,370-2,420 m, (17). TRUJILLO, Hda. Misisí, 14 to 15 km E Trujillo, 2,210-2,365 m, (14). DTO. FEDERAL and MIRANDA, Alto Ño León, 31 to 36 km WSW Caracas, 1,750-2,000 m, (10); Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,050-2,280 m, (89). Total 212.

Oryzomys bicolor Tomes, 1860a:217.

Scattered localities at lower elevations throughout Venezuela. Usually trapped in trees (53 percent), but often on the ground (47 percent); in moist areas (61 percent) or in dry sites (39 percent); in savanna and pasture (41 percent), evergreen forest (31 percent), deciduous and thorn forest (23 percent), cloud forest (3 percent), and yard (2 percent); 1-1,537 m (93 percent below 500 m); bms-T (2), bs-T (26), bh-T (6), bmh-T (2), bh-P (3), and bmh-P (3).

Specimens collected: APURE, Hato Caribén, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (3). BOLÍVAR, 45 km NE Icabarú, 851 m, (2); Río Supamo, 50 km SE El Manteco, 350 m, (3). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (1). FALCÓN, 19 km NW Urama, 25 m, (3). GUÁRICO, Est. Biol. de los Llanos, 9 km SE Calabozo, 100 m, (1). MIRANDA, 1 km S Río Chico, 1 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (12). SUCRE, 16 to 21 km E Cumaná, 1-15 m, (2); Ensenada Cauranta, 9 km NE Güiria, 4 m, (5). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2); Tamatama, Río Orinoco, 130 m, (1). TRUJILLO, 25 km NW Valera, 90 m, (4). Total 42.

Oryzomys capito Olfers, 1818:209.

Humid lowlands of northern and southern Venezuela. Found in houses (57 percent), on the ground, often near rocks or logs (38 percent), or rarely on logs (5 percent); near streams and in other moist areas (92 percent) or in dry places (8 percent); in evergreen (69 percent) and cloud forest (3 percent) or in forest openings such as yards and orchards (28 percent); 25-1,400 m (88 percent below 500 m); bs-T (2), bh-T (24), bh-P (9), bmh-P (4), and bp-MB (1).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); 46 km NE Icabarú, 800 m, (1); Km 125, 85 km SSE El Dorado, 1,032 m, (1). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (1). FALCÓN, 19 km NW Urama, 25 m, (1). MONAGAS, nr. San Agustín, 3 km NW Caripe, 1,320 m, (1). T. F. AMAZONAS, Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); Tamatama, Río Orinoco, 135 m, (21). YARACUY, Minas de Aroa, 20 km NW San Felipe, 400-405 m, (7). ZULIA, nr. Cerro Azul, 39 km NW La Paz, 80 m, (2); Novito, 19 km WSW Machiques, 1,131-1,132 m, (2). Total 40.

Oryzomys concolor Wagner, 1845:147.

Widespread in Venezuela at low and medium elevations and in both dry and humid regions.

Trapped in houses, trees, and on logs (53 percent) or on the ground (47 percent); near streams and in other moist places (74 percent) or in dry sites (26 percent); in evergreen forest (38 percent), yards, orchards, and croplands (25 percent), prairie and pasture (23 percent), and in thorn, deciduous, swamp, or cloud forest (14 percent); 1-2,230 m (88 percent below 1,500 m); me-T (8), bs-T (32), bh-T (28), bmh-T (3), bh-P (12), bmh-P (8), bh-MB (7), and bmh-MB (7).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (3); Río Cinaruco, 65 km NW Pto. Páez, 76 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (3); Hato La Florida, 44 km ESE Caicara, 43 m, (2); Hato San José, 20 km W La Paragua, 306-324 m, (8); 45 to 46 km NE Icabarú, 800-815 m, (4); Km 125, 70 to 85 km SSE El Dorado, 1,000-1,032 m, (3); Río Supamo, 50 km SE El Manteco, 350 m, (1). CARABOBO, 3 km SW Montalbán, 618 m, (1). DTO. FEDERAL, I.V.I.C., 15 km SW Caracas, 1,660 m, (2); Los Venados, 4 km NNW Caracas, 1,473-1,662 m, (5). FALCÓN, Capatárida, 40 m, (8); 19 km NW Urama, 25 m, (1). MIRANDA, Alto Ño León, 31 km WSW Caracas, 1,980 m, (1); Birongo, 60 m, (1); Curupao, 5 km NNW Guarenas, 1,100-1,164 m, (4); 6 km SSE Río Chico, 1 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (17); nr. San Agustín, 3 to 5 km NW Caripe, 1,150-1,200 m, (7). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (2); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (10); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2); Tamatama, Río Orinoco, 135 m, (6). TRUJILLO, La Ceiba, 52 km WNW Valera, 29 m, (1); 12 to 19 km N and WNW Valera, 164-930 m, (2). ZULIA, Novito, 19 km WSW Machiques, 1,155 m, (1). DTO. FEDERAL and MIRANDA, Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,095-2,230 m, (6). Total 105.

Oryzomys fulvescens Saussure, 1860:102.

Widespread in northern, central, and southeastern Venezuela. Found on the ground, usually in the open (86 percent), but occasionally at the bases of trees (5 percent), around logs (4 percent), or in houses (5 percent); usually in moist areas (80 percent), but also in dry areas (20 percent); in a wide variety of habitats—evergreen forest (41 percent), prairie and pasture (25 percent), croplands, orchards, and yards (23 percent), cloud forest (7 percent), and swamp, thorn, and deciduous forest (4 percent); 1-2,405 m (81 percent below 1,500 m); bms-T (3), bs-T (55), bh-T (2), bs-P (6), bh-P (101), bmh-P (11), bh-MB (4), and bmh-MB (35).

Specimens collected: APURE, Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (1). BOLÍVAR, Hato San José, 20 km W La Paragua, 297-300 m, (20); 23 to 55 km NE Icabarú, 800-905 m, (5); Km 125, 85 km SSE El Dorado, 1,032 m, (6). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (2); 1 to 2 km E and SE Montalbán, 598 m, (6). DTO. FEDERAL, Alto Ño León, 31 to 36 km WSW Caracas, 1,770 m, (4); Los Venados, 4 km NNW Caracas, 1,445-1,500 m, (2). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260-1,265 m, (17); Río Socopito, 80 km NW Carora, 480 m, (1). GUÁRICO, Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (2). LARA, Caserio Boro, 10 km N El Tocuyo, 900 m, (2). MÉRIDA, Santa Rosa, 1 km N Mérida, 1,860-1,890 m, (2). MIRANDA, I.V.I.C., 15 km SW Caracas, 1,460 m, (2); 6 km S and SSE Río Chico, 1 m, (5). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (23); San Agustín, 3 to 5 km NW Caripe, 1,150-1,445 m, (77). SUCRE, Cerro Negro, 10 km NW Caripe, 1,525-1,685 m, (20); 2 km E Cumaná, 1 m, (1); Manacal, 26 km ESE Carúpano, 250-425 m, (2). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,370-2,405 m, (12). YARACUY, 10 km NW Urama, 25 m, (2). ZULIA, nr. Cerro Azul, 35 to 40 km NW La Paz, 80 m, (3). Total 217.

Oryzomys macconnelli Thomas, 1910:186.

Mountains of Bolívar and T. F. Amazonas. Trapped on the ground in moist evergreen forest (100 percent); 1,000-1,400 m; bmh-P (1) and bh-MB (1).

Specimens collected: BOLÍVAR, Km 125, 85 km SSE El Dorado, 1,000 m, (1). T. F. AMAZONAS, Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400 m, (1). Total 2.

Oryzomys minutus Tomes, 1860a:215.

High mountains of northern Venezuela. Occasionally captured in trees (6 percent) but more often on the ground in association with rocks (65 percent), tree bases (5 percent), or logs (3 percent), or in the open (21 percent); in relatively dry sites (58 percent) or in moist places (42 percent); in cloud forest (94 percent), páramo and cropland (4 percent), and in evergreen forest, deciduous forest, and orchard (2 percent); 1,150-3,810 m (92 percent between 2,000 and 3,500 m); bh-P (7), bh-MB (9), bmh-MB (77), bmh-M (13), bp-M (205), and p-SA (31).

Specimens collected: MÉRIDA, La Carbonera, 12 km SE La Azulita, 2,180 m, (4); Paramito, 3 to 4 km W Timotes, 3,050-3,345 m, (25); Santa Rosa, 1 to 2 km N Mérida, 1,870-2,055 m, (8); 4 to 9 km SE Tabay, 2,127-3,810 m, (225). MONAGAS, San Agustín, 5 km NW Caripe, 1,150 m, (1). SUCRE, Cerro Negro, 10 km NW Caripe, 1,630-1,690 m, (6). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,350-2,420 m, (48). TRUJILLO, Hda. Misisí, 15 km E Trujillo, 2,360 m, (10). DTO. FEDERAL and MIRANDA, Alto Ño León, 31 to 33 km WSW Caracas, 1,750-1,996 m, (2); Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,080-2,241 m, (13). Total 342.

Oryzomys sp. A.

Eastern Llanos. Trapped on the ground (75 percent) and in a house (25 percent); in moist (75 percent) or dry sites (25 percent); in prairie (100 percent); 18 m; bs-T (4).

Specimens collected: MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (4). Total 4.

Remarks: For notes on the systematics and nomenclature of this species, see Handley (in press).

Oryzomys sp. ?

Specimens collected: BOLÍVAR, Hato San José, 20 km W La Paragua, 306 m, (1). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,470 m, (1). MÉRIDA, 5 to 8 km ESE and SE Tabay, 2,570-3,430 m, (7). MIRANDA, 1 km S Río Chico, 1 m, (1); San Andrés, 16 km SSE Caracas, 1,144 m, (1). MONAGAS, nr. San Agustín, 3 to 5 km NW Caripe, 1,150-1,320 m, (3). NUEVA ESPARTA, Isla Margarita, 3 km NE La Asunción, 405 m, (1). SUCRE, Ensenada Cauranta, 9 km NE Güiria, 4 m, (1). Total 16.

Neacomys tenuipes Thomas, 1900:153.

Mountains of northern Venezuela and Bolívar. Usually found on the ground, associated with rocks (39 percent), or under dense cover of ferns, herbs, shrubs, or vines (50 percent), rarely on logs (11 percent); near streams and in other moist areas (100 percent); in evergreen (41 percent) or cloud forest (37 percent), and occasionally in openings such as yards, orchards, and croplands (22 percent); 404-1,655 m; bs-P (1), bh-P (1), bmh-P (3), bh-MB (11), and bmh-MB (12).

Specimens collected: ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,050 m, (2). BOLÍVAR, 45 km NE Icabarú, 851 m, (1). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,443-1,655 m, (11). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260-1,265 m, (6). MIRANDA, 3 km NE Caracas, 1,170 m, (1); I.V.I.C., 15 km SW Caracas, 1,460 m, (6). YARACUY, Minas de Aroa, 20 km NW San Felipe, 404 m, (1). Total 28.

Nectomys alfari J. A. Allen, 1897:39.

Foothills of the Sierra de Perijá. Trapped on the ground (100 percent); near a stream (68 percent) and in a relatively dry site (32 percent); under low bushes in a banana patch (100 percent); 1,134-1,155 m; bmh-P (3).

Specimens collected: ZULIA, Novito, 19 km WSW Machiques, 1,134-1,155 m, (3). Total 3.

Nectomys squamipes Brants, 1827:138.

Humid lowlands and foothills of southern, western, and eastern Venezuela. Caught on the ground (100 percent); usually in or near grass (80 percent), but also among palms, banana plants, shrubs, and herbs (7 percent), among boulders and logs beside streams (7 percent), under tin in a garbage pile (3 percent), and in houses (3 percent); usually in or near streams (65 percent) or in other damp places (19 percent), but occasionally in dry situations (16 percent); in evergreen forest (69 percent) and in forest openings, such as yards (13 percent), marsh edges (11 percent), and pastures, orchards, and gardens (7 percent); 24-1,180 m (94 percent below 500 m); bs-T (18), bh-T (49), bmh-T (21), bh-P (5), and bmh-P (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (8); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (2). BARINAS, Altamira, 697 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Hato La Florida, 44 to 53 km ESE Caicara, 40-56 m, (11); Hato San José, 20 km W La Paragua, 297-306 m, (5); 19 km NE Icabarú, 658 m, (1). MONAGAS, San Agustín, 5 km NW Caripe, 1,150-1,180 m, (4). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (12); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (24); 25 to 35 km S Pto. Alacucho, 114-135 m, (4); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (5). ZULIA, El Rosario, 37 to 60 km WNW Encontrados, 37-73 m, (11); Kasmera, 21 km SW Machiques, 270-275 m, (3). Total 94.

Rhipidomys couesi J. A. Allen and Chapman, 1893:211.

Extreme northeastern Venezuela, Andes, and southern Venezuela. Caught in coconut and stilt palms and on a log (50 percent), on the ground and at the base of a coconut palm (33 percent), and in a house (17 percent); in dry (57 percent) or moist situations (43 percent); in evergreen forest (43 percent), orchards (43 percent), and cloud forest (14 percent); 1-1,400 m; bms-T (1), bs-T (2), bh-P (2), bmh-P (1), and bp-MB (1).

Specimens collected: BARINAS, Altamira, 600 m, (1). NUEVA ESPARTA, Isla Margarita, 3 km NE La Asunción, 410-415 m, (2). SUCRE, 24 km E Cumaná, 1 m, (1); Ensenada Cauranta, 9 km NE Güiria, 4 m, (2). T. F. AMAZONAS, Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400 m, (1). Total 7.

Rhipidomys fulviventer Thomas, 1896:304.

Táchira Andes and mountains of Bolívar and T. F. Amazonas. Trapped on the ground, beside and beneath logs, rocks, and trees and in thickets (43 percent), on logs (33 percent), and in trees and vines (24 percent); usually near streams and in other moist areas (97 percent) and only rarely in dry situations (3 percent); in cloud forest (54 percent), evergreen forest (33 percent), and clearings such as pastures and croplands (13 percent); 1,032-2,422 m; bmh-P (12), bmh-MB (26), and bp-MB (1).

Specimens collected: BOLÍVAR, Km 125, 85 km SSE El Dorado, 1,032 m, (12). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,370-2,422 m, (26). T. F. AMAZONAS, Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400 m, (1). Total 39.

Rhipidomys leucodactylus Tschudi, 1845:183.

Orinocan lowlands of southern T. F. Amazonas. Shot in houses, mostly in the thatch (80 percent), and trapped on the ground (20 percent); near streams and other moist areas (80 percent) and occasionally in dry places (20 percent); in evergreen forest (83 percent) and clearings (17 percent); 135-145 m; bh-T (6) and bmh-T (2).

Specimens collected: T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (2); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (5); Tamatama, Río Orinoco, 135 m, (1). Total 8.

Rhipidomys macconnelli de Winton, 1900:52.

Mountains of Bolívar and T. F. Amazonas. Trapped on the ground and on cliffs (81 percent) or on logs and in trees (19 percent); near streams and in other moist areas (100 percent); in evergreen forest (100 percent); 750-1,480 m; bmh-P (26), bp-P (9), and bp-MB (42).

Specimens collected: BOLÍVAR, Km 125, 85 km SSE El Dorado, 1,032-1,165 m, (26). T. F. AMAZONAS, Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400-1,480 m, (38); Cabecera del Caño Negro, Cerro Duida, 32 km NW Esmeralda, 1,400 m, (4); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 750-825 m, (9). Total 77.

Rhipidomys mastacalis Lund, 1841:240.

Southern Venezuela. Trapped most often in houses (75 percent), but also in trees and on logs (15 percent), or on the ground (10 percent); in moist situations (100 percent) in homesteads and orchards (82 percent) and in evergreen forest (18 percent); 130-1,480 m; bh-T (5), bh-P (5), bmh-P (37), bp-P (2), and bp-MB (1).

Specimens collected: BOLÍVAR, El Manaco, 56 to 70 km SE El Dorado, 150 m, (4); 45 to 53 km NE Icabarú, 800-923 m, (42). T. F. AMAZONAS, Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,480 m, (1); Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, 750 m, (2); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1). Total 50.

Rhipidomys venezuelae Thomas, 1896:303.

Northwestern Venezuela. Trapped on the ground (53 percent), in trees (28 percent) and on logs (6 percent), and in houses and caverns (13 percent); mostly in moist situations (80 percent) but also in dry places (20 percent); in cloud (52 percent), evergreen (24 percent), and thorn forest (10 percent), and in yards (14 percent); 13-1,500 m; me-T (3), bms-T (1), bh-T (1), bs-P (1), bh-P (5), bmh-P (15), and bh-MB (4).

Specimens collected: CARABOBO, 4 km NNW Montalbán, 1,000 m, (2). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,470-1,500 m, (4). FALCÓN, Capatárida, 40 m, (1); 14 km ENE Mirimire, 190 m, (1); Península de Paraguaná, 15 to 25 km SSW and SW Pueblo Nuevo, 13-595 m, (17); Río Socopito, 80 km NW Carora, 470 m, (2). LARA, Caserio Boro, 10 to 13 km N and NW El Tocuyo, 537-900 m, (2). TRUJILLO, 12 km WNW Valera, 930 m, (1). Total 30.

Rhipidomys venustus Thomas, 1900:152.

Andes and mountains of northern Venezuela. Usually caught in trees and vines (68 percent), but also found at the bases of shrubs in banana and coffee plantations (14 percent), on rock ledges (11 percent), in houses (5 percent), and in a hollow log (2 percent); in moist areas (78 percent) or in dry sites (22 percent); in cloud (55 percent) and evergreen forests (40 percent) or in orchards (5 percent); 1,160-3,160 m; bh-P (17), bh-MB (1), bmh-MB (28), and bp-M (6).

Specimens collected: MÉRIDA, 6 to 7 km ESE and SE Tabay, 2,250-3,160 m, (6). MONAGAS, nr. San Agustín, 3 to 5 km NW Caripe, 1,160-1,340 m, (17). TRUJILLO, Hda. Misisí, 14 km E Trujillo, 2,210 m, (15). DTO. FEDERAL and MIRANDA, Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,095-2,223 m, (14). Total 52.

Rhipidomys sp. ?

Specimens collected: BOLÍVAR, 45 to 46 km NE Icabarú, 800-815 m, (2); Km 125, 85 km SSE El Dorado, 1,032 m, (1). T. F. AMAZONAS, Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400 m, (1). Total 4.

Thomasomys aureus Tomes, 1860a:219.

Táchira Andes. Caught in a tree near a stream in cloud forest; 2,400 m; bmh-MB (1).

Specimen collected: TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,400 m, (1). Total 1.

Thomasomys hylophilus Osgood, 1912:50.

Táchira Andes. Trapped at the bases of trees and among tree roots, often in bamboo thickets (43 percent), beside and under mossy rotting logs (17 percent), in thick growths of shrubs and tree ferns (15 percent), on mossy tree limbs (10 percent), in litter on stream banks (10 percent), and under tangled vines (5 percent); near streams and in other damp places (100 percent); most often in cloud forest (80 percent), but also in clearings used for pasture and crops (15 percent) and in evergreen forest (5 percent); 2,350-2,425 m; bmh-MB (40).

Specimens collected: TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,350-2,425 m, (40). Total 40.

Thomasomys laniger Thomas, 1895a:59.

Mérida Andes. Caught among lichen- and moss-covered boulders and in rock slides (59 percent), in thick, low shrubs on the ground (30 percent), at the base of trees and logs (6 percent), in trees (3 percent), and in a house (2 percent); most often in relatively dry habitats (76 percent), but frequently in damp places (24 percent); in cloud forest and páramo (100 percent); 2,210-3,560 m; bmh-MB (10), bmh-M (4), bp-M (50), and p-SA (5).

Specimens collected: MÉRIDA, Paramito, 3 to 4 km W Timotes, 3,147-3,266 m, (5); 5 to 9 km ESE and SE Tabay, 2,570-3,560 m, (54). TRUJILLO, Hda. Misisí, 14 to 15 km E Trujillo, 2,210-2,360 m, (10). Total 69.

Thomasomys lugens Thomas, 1896:306.

Mérida Andes. Trapped beside logs and at the base of trees and tree ferns (45 percent), among moss- and lichen-covered boulders (22 percent), in thick cover of herbs and ferns on the ground (22 percent), and on logs (11 percent); usually in damp habitats (94 percent) but rarely in relatively dry places (6 percent); in cloud forest (100 percent); 1,990-3,172 m; bh-MB (4), bmh-MB (7), bmh-M (1), and bp-M (6).

Specimens collected: MÉRIDA, Paramito, 3 km W Timotes, 3,172 m, (1); Santa Rosa, 2 km N Mérida, 1,990-2,040 m, (4); 5 to 6 km ESE Tabay, 2,590-2,710 m, (6). TRUJILLO, Hda. Misisí, 14 to 15 km E Trujillo, 2,210-2,360 m, (7). Total 18.

Thomasomys vestitus Thomas, 1898:454.

Mérida Andes. Trapped under a mossy log on damp ground and on a log over a small stream, both in cloud forest; 2,350 m; bmh-MB (2).

Specimens collected: TRUJILLO, Hda. Misisí, 15 km E Trujillo, 2,350 m, (2). Total 2.

Thomasomys sp. ?

Specimens collected: MÉRIDA, 5 to 6 km ESE Tabay, 2,580-2,670 m, (3). Total 3.

Chilomys instans Thomas, 1895b:368.

Táchira and Mérida Andes. Taken at the base of rotting moss-covered trees (40 percent), under moss-covered logs and fallen limbs (40 percent), and under lichen- and moss-covered tree roots (20 percent); in openings and in dense tangles of vines and bamboo in moist fern, moss, and lichen-laden cloud forest (100 percent); 2,405-2,700 m; bmh-MB (3) and bp-M (2).

Specimens collected: MÉRIDA, 5 to 6 km ESE Tabay, 2,630-2,700 m, (2). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,405-2,430 m, (3). Total 5.

Akodon urichi J. A. Allen and Chapman, 1897:19.

Mountainous areas east of Lago de Maracaibo. Normally trapped on the ground (99 percent) but once caught on a log (1 percent); usually near streams and in other moist areas (87 percent) but occasionally in dry sites (13 percent); usually in old fields, clearings and other grassy areas, with the grass often tall and thick, often mixed with ferns and herbs, sometimes associated with rocks and logs (54 percent), or in second growth shrubs mixed with vines, herbs, and ferns (35 percent), or rarely in thick forest (11 percent); usually in evergreen (50 percent), cloud (7 percent), or deciduous forest (1 percent), or in forest openings such as croplands (21 percent), yards and gardens (11 percent), pastures (7 percent), and orchards (3 percent); 24-2,232 m (80 percent above 1,000 m); bs-T (1), bmh-T (1), bs-P (13), bh-P (20), bmh-P (18), bh-MB (26), bmh-MB (27), and bp-MB (10)—(98 percent above the Tropical zone).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). ARAGUA, Est. Biol. Rancho Grande, 13 km NW Maracay, 1,050-1,059 m, (9). BOLÍVAR, 45 km NE Icabarú, 851 m, (2); Km 125, 70 to 85 km SSE El Dorado, 1,032 m, (3). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (4); 2 to 4.5 km SE Montalbán, 598 m, (11). DTO. FEDERAL, Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (3); I.V.I.C., 15 km SW Caracas, 1,580 m, (1); Los Venados, 4 km NNW Caracas, 1,443-1,635 m, (13); Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,185-2,232 m, (22). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260-1,280 m, (10). GUÁRICO, Parque Nac. Guatopo, 15 km NW Altagracia, 710-720 m, (2). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160 m, (2). MONAGAS, San Agustín, 5 km NW Caripe, 1,180 m, (6). SUCRE, Cerro Negro, 10 km NW Caripe, 1,560-1,680 m, (5); Manacal, 26 km ESE Carúpano, 190-425 m, (4). T. F. AMAZONAS, Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, 1,400 m, (10). DTO. FEDERAL and MIRANDA, Alto Ño León, 31 to 33 km WSW Caracas, 1,770-2,025 m, (8). Total 116.

Remarks: A single specimen collected in the páramo at 3,020 m near Paramito, 3 km W Timotes, MÉRIDA, is tentatively referred to *Akodon urichi*.

Microxus bogotensis Thomas, 1895b:369.

Mérida and Táchira Andes. Caught on the ground (92 percent) or on moss-covered logs (8 percent); either in dry sites (52 percent) or near streams and in other moist areas (48 percent); usually in rocks (50 percent), but also under mossy rotting logs, roots, and brush piles (33 percent), and in grass, shrubs, and bamboo thickets (17 percent); in cloud forest (96 percent) and openings such as cropland (4 percent); 2,360-3,815 m; bmh-MB (10), bp-M (10), and p-SA (6).

Specimens collected: MÉRIDA, 7 to 9 km SE Tabay, 3,170-3,815 m, (16). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,370-2,420 m, (9). TRUJILLO, Hda. Misisí, 15 km E Trujillo, 2,360 m, (1). Total 26.

Zygodontomys brevicauda J. A. Allen and Chapman, 1893:215.

Low elevation grasslands throughout Venezuela. Captured on the ground (100 percent); usually near streams and in other damp areas (81 percent) but occasionally in dry habitats (19 percent); in and under boxes and junk in and around houses (33 percent), in grass (26 percent), at the base of trees and logs (15 percent), among ferns, herbs, weeds, or vegetables (10 percent), under shrubs and vines (8 percent), around boulders and termite mounds (6 percent), and in brush piles (2 percent); in prairie and pasture (30 percent), croplands (17 percent), yards and orchards (9 percent), grassy openings and borders in evergreen (38 percent), deciduous (2 percent), and thorn forest (2 percent), and marsh and cloud forest edges (2 percent); 1-1,180 m (93 percent below 500 m); bms-T (42), bs-T (428), bh-T (207), bmh-T (69), bs-P (8), bh-P (76), bmh-P (2), and bmh-MB (1).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (2); Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (10); Río Cinaruco, 65 km NW Pto. Páez, 76 m, (6). BOLÍVAR, 5 km NNW Guasipati, 190 m, (1); Hato La Florida, 44 to 53 km SE Caicara, 43-100 m, (30); Hato San José, 20 km W La Paragua, 297-306 m, (6); 46 to 56 km NE Icabarú, 800-923 m, (9). CARABOBO, nr. Montalbán, 579-598 m, (7). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260 m, (1); 14 km ENE Mirimire, 90 m, (3); Río Socopito, 80 km NW Carora, 470-480 m, (56). GUÁRICO, Est. Biol. de los Llanos, 9 km SE Calabozo, 100 m, (2); Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (17); Hato Los Leones, Caño Agua Fría, 23 km NE Calabozo, 89 m, (2). LARA, Caserio Boro, 10 km N El Tocuyo, 537 m, (32). MIRANDA, Río Chico and 1 to 6 km SSE and S Río Chico, 1 m, (108). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (59); San Agustín, 5 km NW Caripe, 1,150-1,180 m, (8). NUEVA ESPARTA, Isla Margarita, 3 km NE La Asunción, 395-420 m, (6). SUCRE, 21 to 24 km E Cumaná, 1-20 m, (10); Ensenada Cauranta, 9 km NE Güiria, 1-4 m, (20); Manacal, 26 km ESE Carúpano, 175-425 m, (16). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (69); Esmeralda, Río Orinoco, 135 m, (47); 18 to 25 km S Pto. Ayacucho, 119-145 m, (10); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (85); Tamatama, Río Orinoco, 135 m, (2). TRUJILLO, La Ceiba, 52 km WNW Valera, 29 m, (11); 25 to 30 km NW Valera, 90 m, (136). ZULIA, nr. Cerro Azul, 35 to 40 km NW La Paz, 80 m, (4); El Rosario, 45 km WNW Encontrados, 37 m, (1). CARABOBO, FALCÓN, and YARACUY, 10 to 19 km NW Urama, 25 m, (57). Total 833.

Calomys hummelincki Husson, 1960:34.

Llanos of the Orinoco and deserts around Golfo de Venezuela. Caught on the ground (100 percent); usually in moist (86 percent) but occasionally in dry sites (14 percent); in grass (86 percent), houses (9 percent), and in nests under a slab of bark and under a bottle (5 percent); in sandy grassland (95 percent), thorn forest (2.5 percent), and yards (2.5 percent); 15-76 m; me-T (1), bms-T (1), and bs-T (42).

Specimens collected: APURE, Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (6). FALCÓN, Península de Paraguaná, 15 km SSW Pueblo Nuevo, 55 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (36). ZULIA, nr. Cojoro, 34 km NNE Paraguaipoa, 15 m, (1). Total 44.

Holochilus brasiliensis Desmarest, 1819a:62.

Widely scattered moist lowland localities throughout Venezuela east of Lago de Maracaibo. Trapped on the ground (100 percent); usually near streams and in other moist areas (95 percent), and only rarely in dry situations (5 percent); in croplands (41 percent), grasslands (39 percent), yards (10 percent), and in openings in evergreen forest (10 percent); 18-658 m; bs-T (29), bh-T (1), bmh-T (1), bh-P (3), and bh-P (5).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). BOLÍVAR, Hato San José, 20 km W La Paragua, 297-306 m, (4); 19 km NE Icabarú, 658 m, (4). CARABOBO, Montalbán, 562-618 m, (4). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (7). T. F. AMAZONAS, Tamatama, Río Orinoco, 135 m, (1). TRUJILLO, 30 km NW Valera, 90-99 m, (15). YARACUY, 10 km NW Urama, 25 m, (3). Total 39.

Sigmodon hispidus Say and Ord, 1825:354.

Grassy lowlands and foothills of northwestern Venezuela. Found on the ground (100 percent); near streams, irrigation ditches, and other moist areas (91 percent) and only rarely in dry sites (9 percent); usually in grass, but rarely in weeds, bushes, and houses; in croplands (44 percent), savannas and pastures (31 percent), yards and orchards (16 percent), and in grassy openings in forest (9 percent); 200-1,580 m (90 percent between 500 and 1,000 m); bms-T (89), bs-T (1), bh-T (1), bs-P (195), bh-P (7), bmh-P (16), bh-MB (13), and bmh-MB (4).

Specimens collected: ARAGUA, El Limón, 4 km NW Maracay, 524 m, (1). BARINAS, Altamira, 600-794 m, (14). CARABOBO, nr. Montalbán, 562-1,000 m, (198). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,485-1,580 m, (13). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,257-1,265 m, (4); 11 km ENE Mirimire, 200 m, (1); Río Socopito, 80 km NW Carora, 480 m, (1). LARA, Caserio Boro, 10 km N El Tocuyo, 518-900 m, (89). MÉRIDA, Mesa Bolívar, 22 km SSE El Vigía, 690 m, (1). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160 m, (1). ZULIA, Kasmera, 21 km SW Machiques, 270 m, (1); Novito, 19 km WSW Machiques, 1,134-1,135 m, (2). Total 326.

Sigmomys alstoni Thomas, 1881:691.

Low elevation grasslands of eastern and southern Venezuela. Caught on the ground (100 percent); in dry situations (54 percent) or in moist areas (46 percent); usually in grass, but sometimes in sedge, houses, gardens, and weed patches; in savanna and pasture (62 percent), yards, orchards, and croplands (19 percent), forest openings (13 percent), and marsh borders (6 percent); 1-1,180 m (81 percent below 500 m); bms-T (8), bs-T (89), bh-T (8), bh-P (19), and bmh-P (16).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 32 km NE Pto. Páez, 76 m, (6); Pto. Páez to Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (10); Río Cinaruco, 65 km NW Pto. Páez, 76 m, (1). BOLÍVAR, Hato La Florida 44 to 53 km SE Caicara, 43-56 m, (6); 46 to 53 km NE Icabarú, 800-923 m, (21). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (58); San Agustín, 5 km NW Caripe, 1,180 m, (6). SUCRE, 2 km E Cumaná, 1 m, (8); Manacal, 26 km ESE Carúpano, 410-424 m, (8). T. F. AMAZONAS, 18 to 25 km S Pto. Ayacucho, 119-145 m, (8); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (8). Total 140.

Anotomys trichotis Thomas, 1897:220.

Táchira Andes. Trapped on a moss-covered rock under an overhanging dirt bank beside a stream in mature cloud forest; 2,400 m; bmh-MB (1).

Specimen collected: TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,400 m, (1). Total 1.

Daptomys venezuelae Anthony, 1929:2.

Cerro Duida. Trapped on the ground beside a stream in evergreen forest; 1,400 m; bp-MB (1).

Specimen collected: T. F. AMAZONAS, Cabecera del Caño Negro, Cerro Duida, 32 km NW Esmeralda, 1,400 m, (1). Total 1.

Subfamily MURINAE

Rattus norvegicus Berkenhout, 1769:5.

Northern Venezuela. Caught on the ground (100 percent); in moist areas (100 percent); in piles of brush and logs (40 percent), in buildings (40 percent), and in grass (20 percent); in evergreen forest (60 percent), cloud forest (20 percent), and prairie (20 percent); 18-2,150 m; bs-T (1), bh-MB (3), and bmh-MB (1).

Specimens collected: DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,460-1,498 m, (2); Pico Ávila, nr. Hotel Humboldt, 5 km NNE Caracas, 2,150 m, (1). MIRANDA, I.V.I.C., 15 km SW Caracas, 1,460 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1). Total 5.

Rattus rattus Linnaeus, 1758:61.

Throughout northern Venezuela and at scattered localities in southern Venezuela. Usually found on the ground (95 percent) but also rarely in trees, vines, and shrubs (5 percent); near streams and in other moist areas (67 percent) or in dry sites (33 percent); in houses (65 percent), in grass and weeds (25 percent), around rocks and boulders (6 percent), and in trees, vines, and shrubs (4 percent); in openings such as homesteads, croplands, pastures, and orchards (61 percent), and in evergreen (26 percent), cloud (7 percent), and thorn forest (6 percent); 1-3,020 m (79 percent below 500 m); me-T (3), bms-T (24), bs-T (64), bh-T (70), bmh-T (3), bs-P (20), bh-P (47), bmh-P (10), bh-MB (13), bmh-MB (5), and p-SA (1).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (1); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (3). BOLÍVAR, Hato San José, 20 km W La Paragua, 300-312 m, (6). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (10); Montalbán to 1.2 km SE Montalbán, 598 m, (20). DTO. FEDERAL, Alto Ño León, 31 km WSW Caracas, 1,770 m, (2); Hda. Carapiche, nr. El Limón, 48 km W Caracas, 398 m, (29). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (4); Capatárida, 40 m, (1); 14 km ENE Mirimire, 200 m, (3); Península de Paraguaná, 15 to 25 km SSW and SW Pueblo Nuevo, 13-55 m, (12). MÉRIDA, Paramito, 3 km W Timotes, 3,020 m, (1); Santa Rosa, 1 km N Mérida, 1,850-1,860 m, (8). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160 m, (1); I.V.I.C., 15 km SW Caracas, 1,460 m, (3); 1 to 6 km SSE and S Río Chico, 1 m, (8). MONAGAS, Cueva del Guácharo, 5 km W Caripe, 1,010-1,180 m, (6); Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (6). NUEVA ESPARTA, Isla Margarita, 3 km NNE La Asunción, 37-50 m, (10). SUCRE, 16 km E Cumaná, 1 m, (3); Ensenada Cauranta, 9 km NE Güiria, 4-7 m, (7); Manacal, 26 km ESE Carúpano, 300 m, (6). T. F. AMAZONAS, 25 to 32 km SSW Pto. Ayacucho, 114-135 m, (5); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (63). TRUJILLO, Hda. Misisí, 13 km E Trujillo, 1,830 m, (5); La Ceiba, 47 km WNW Valera, 29 m, (1); 25 to 30 km NW and NNW Valera, 90-130 m, (33). YARACUY, Minas de Aroa, 20 km NW San Felipe, 400 m, (2). ZULIA, nr. Cojoro, 35 km NNE Paraguaipoa, 5 m, (1). Total 260.

Mus musculus Linnaeus, 1758:62.

Northern Venezuela. Trapped on the ground (100 percent); in dry sites (95 percent) or rarely in moist places (5 percent); in houses (60 percent), in grass and herbs (21 percent), and in stone walls and rock piles (19 percent); in yards, croplands, orchards, and pasture (52 percent), in páramo (29 percent), or in openings in thorn (16 percent) or cloud forest (3 percent); 2-3,259 m; me-T (12), bms-T (28), bs-T (1), bs-P (2), bh-P (3), bmh-P (1), bh-MB (9), bmh-MB (1), bmh-M (5), and p-SA (21).

Specimens collected: BARINAS, Altamira, 794 m, (1). CARABOBO, Montalbán, 598 m, (2). DTO. FEDERAL, Alto Ño León, 31 km WSW Caracas, 1,770 m, (1); Los Venados, 4 km NNW Caracas, 1,546 m, (1). FALCÓN, Capatárida, 40 m, (1); Península de Paraguaná, 15 km SSW Pueblo Nuevo, 55 m, (5). LARA, Caserio Boro, 10 km N El Tocuyo, 537 m, (1). MÉRIDA, Paramito, 3 to 4 km W Timotes, 3,004-3,259 m, (26). MONAGAS, San Agustín, 5 km NW Caripe, 1,180 m, (3). NUEVA ESPARTA, Isla Margarita, 7 km SW Porlamar, 2 m, (11); 3 km NNE La Asunción, 37-38 m, (20). SUCRE, 16 km E Cumaná, 5 m, (2).

TRUJILLO, Hda. Misisí, 13 km E Trujillo, 1,700-1,800 m, (8). CARABOBO and YARACUY, 10 km NW Urama, 25 m, (1). Total 83.

Suborder CAVIOMORPHA

Family ERETHIZONTIDAE

Coendou prehensilis Linnaeus, 1758:57.

Forested lowlands of T. F. Amazonas and northern and western Venezuela. Usually taken in trees (91 percent) or rarely on the ground (9 percent); near streams and in other moist areas (77 percent) or in dry sites (23 percent); in evergreen (80 percent) or deciduous forest (7 percent) or in yards and croplands (13 percent); 24-1,524 m (77 percent below 500 m); bs-T (1), bh-T (4), bmh-T (2), bh-P (6), bmh-P (3), and bh-MB (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). DTO. FEDERAL, Los Venados, 4 km NNW Caracas, 1,524 m, (1). FALCÓN, nr. Mirimire, 250 m, (1). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160 m, (1). MONAGAS, San Agustín, 5 km NW Caripe, 1,180-1,200 m, (2). SUCRE, Manacal, 26 km ESE Carúpano, 300 m, (2). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (3). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 76 m, (1); El Rosario, 48 km WNW Encontrados, 54 m, (1). Total 17.

Coendou pruinosus Thomas, 1905:310.

Southwest of Lago de Maracaibo. Found in a tree in an upland area in mature evergreen forest; 54 m; bh-T (1).

Specimen collected: ZULIA, El Rosario, 48 km WNW Encontrados, 54 m, (1). Total 1.

Family CAVIIDAE

Cavia porcellus Linnaeus, 1758:59.

Mountains of northern Venezuela. Captured on the ground (100 percent); in dry upland sites (71 percent) or occasionally in moist situations (29 percent); usually in tall grass and weeds and low shrubs; in grasslands (68 percent), orange groves (18 percent), croplands and gardens (11 percent), and scrubby evergreen forest (3 percent); 598-1,200 m; bs-P (3) and bh-P (25).

Specimens collected: CARABOBO, nr. Montalbán, 598 m, (3). MONAGAS, San Agustín, 3 to 5 km NW Caripe, 1,180-1,200 m, (25). Total 28.

Family HYDROCHAERIDAE

Hydrochaeris hydrochaeris Linnaeus, 1766:103.

Bolívar, T. F. Amazonas, and the Llanos. Found on the ground (100 percent); in streams or on streambanks (88 percent) or in uplands away from water (12 percent); in grasslands (35 percent), and in evergreen (30 percent), deciduous (30 percent), or thorn forest (5 percent); 18-350 m; bs-T (24), bh-T (2), and bh-P (1).

Specimens collected: APURE, Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (3); Río Cinaruco, 48 km NW Pto. Páez, 76 m, (3); Río Cinaruco, 65 km NW Pto. Páez, 76 m, (5). BOLÍVAR, Hato La Florida, 44 to 45 km ESE Caicara, 45-65 m, (7); Hato San José, 20 km W La Paragua, 297 m, (2); Río Supamo, 50 km SE El Manteco, 350 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (4). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 27.

Family DASYPROCTIDAE

Agouti paca Linnaeus, 1766:81.

Moist lowlands of Venezuela. Found on the ground (100 percent); usually near streams and in other moist areas (83 percent) or less often in dry places (17 percent); in evergreen forest (87 percent), savanna or pasture (5 percent), cloud forest (3 percent), deciduous and thorn forest (3 percent), and orchard (2 percent); 1-1,537 m (94 percent below 500 m); bs-T (11), bh-T (59), bmh-T (16), bh-P (21), and bmh-P (4).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2); Pto. Páez to Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (1). BOLÍVAR, El Manaco, 56 to 59 km SE El Dorado, 150 m, (12); Hato La Florida, 44 to 63 km SE and ESE Caicara, 40-65 m, (4); 19 km NE Icabarú, 658 m, (3); Los Patos, 25 to 28 km SE El Manteco, 150-350 m, (4); Río Supamo, 50 km SE El Manteco, 350 m, (7). CARABOBO, La Copa, 4 km NW Montalbán, 1,537 m, (3). FALCÓN, nr. Mirimire and up to 14 km ENE Mirimire, 125-250 m, (6). MIRANDA, 1 km S Río Chico, 1 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (14);

Boca Mavaca, 84 km SSE Esmeralda, 138 m, (11); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); Esmeralda, Río Orinoco, 135 m, (1); Pto. Ayacucho to 65 km SSW Pto. Ayacucho, 119-161 m, (9); Río Mavaca, 108 km SSE Esmeralda, 140 m, (3); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (1). YARACUY, Minas de Aroa, 19 km WNW San Felipe, 500 m, (1). ZULIA, El Rosario, 45 to 60 km WNW Encontrados, 37-73 m, (22); Kasmera, 21 km SW Machiques, 270 m, (2). Total 111.

Agouti taczanowskii Stolzmann, 1885:161.

Mérida and Táchira Andes. Most specimens are without ecological data; two were taken on the ground near a stream in cloud forest; 2,000-3,000 m (69 percent between 2,500 and 3,000 m); bmh-MB (2) and bmh-M (27).

Specimens collected: MÉRIDA, Paramito, 3 to 4 km W Timotes, 2,000-3,000 m, (27). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,380 m, (2). Total 29.

Dasyprocta aguti Linnaeus, 1766:80.

Lowlands of Bolívar, northern T. F. Amazonas, and northeastern Venezuela. Found on the ground (100 percent); usually near streams and in other moist areas (87 percent) but occasionally in dry areas (13 percent); in evergreen forest (77 percent), in openings such as pasture, cropland, orchards, or yards (15 percent) and in deciduous and thorn forest (8 percent); 2-854 m (89 percent below 500 m); bms-T (1), bs-T (4), bh-T (40=71 percent), bs-P (3), bh-P (5), and bmh-P (3).

Specimens collected: BOLÍVAR, El Manaco, 56 to 59 km SE El Dorado, 150 m, (20); 43 to 45 km NE Icabarú, 851-854 m, (3); Km 33, 28 km SE El Dorado, 100 m, (2); Los Patos, 25 km SE El Manteco, 350 m, (1); Río Supamo, 50 km SE El Manteco, 350 m, (2). CARABOBO, Montalbán, 598 m, (3). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (1); nr. Mirimire and 16 to 18 km NE Mirimire, 60-250 m, (4). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (2). T. F. AMAZONAS, 32 km S Pto. Ayacucho, 155 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (17). Total 56.

Dasyprocta fuliginosa Wagler, 1832:1220.

Southern T. F. Amazonas. Captured on the ground (100 percent); near streams and other moist areas (100 percent); in evergreen (88 percent) or deciduous forest (12 percent); 135-150 m; bh-T (6) and bmh-T (2).

Specimens collected: T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Esmeralda, Río Orinoco, 135 m, (2); Tamatama, Río Orinoco, 135 m, (3). Total 8.

Dasyprocta variegata Tschudi, 1845:190.

Zulia and western Apure. Captured on the ground (100 percent); in dry areas (65 percent) or near streams and other moist areas (35 percent); in evergreen forest (100 percent); 24-50 m; bh-T (23) and bmh-T (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (2). ZULIA, El Rosario, 45 to 51 km WNW Encontrados, 37-50 m, (23). Total 25.

Myoprocta pratti Pocock, 1913:110.

T. F. Amazonas. Found on the ground (100 percent); near streams and in other moist areas (100 percent); in evergreen forest (100 percent); 135-150 m; bh-T (9) and bmh-T (1).

Specimens collected: T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (4); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); Tamatama, Río Orinoco, 135 m, (4). Total 10.

Family ECHIMYIDAE

Proechimys canicollis J. A. Allen, 1899:200.

Foothills of Sierra de Perijá in northwestern Venezuela. Trapped on the ground (100 percent); in moist (50 percent) or dry sites (50 percent); in evergreen and deciduous forest, cropland, and orchard (25 percent each); 75-80 m; bs-T (4).

Specimens collected: ZULIA, nr. Cerro Azul, 33 to 40 km NW La Paz, 75-80 m, (4). Total 4.

Proechimys guyannensis E. Geoffroy, 1803:194.

Lowlands of Bolívar and T. F. Amazonas. Found on the ground (100 percent); usually near streams and other moist areas (95 percent) or rarely in dry situations (5 percent); in shrubs, herbs, and grass (74 percent), in houses (15 percent), at the base of trees and boulders and beside and under logs (8 percent), on logs (2 percent), and in a hollow tree (1 percent); in evergreen forest (87 percent), and in a hollow tree (1 percent); in evergreen forest (87 percent) and brushy openings such as yards (7 percent), orchards (2 percent), and pastures (2 percent), or in swamps (2 percent); 43-851 m (96 percent below 500 m); bs-T (31), bh-T (282), bmh-T (31), bh-P (12), and bmh-P (5).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Hato La

Florida, 44 to 47 km ESE Caicara, 43-130 m, (24); Hato San José, 20 to 32 km W and NW La Paragua, 297-324 m, (9); 28 to 45 km NE Icabarú, 775-851 m, (14); Río Supamo, 50 km SE El Manteco, 150-350 m, (3). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (31); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (11); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (14); Pto. Ayacucho to 33 km S and SSE Pto. Ayacucho, 99-135 m, (59); Río Mavaca, 108 km SSE Esmeralda, 140 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (179); Tamatama, Río Orinoco, 135 m, (14). Total 361.

Proechimys hoplomyoides Tate, 1939:179.

Bolívar and T. F. Amazonas. Captured on the ground (100 percent); near streams and in other moist areas (100 percent); in evergreen forest (75 percent) and in an orchard (25 percent); 135-1,032 m; bh-T (1) and bmh-P (3).

Specimens collected: BOLÍVAR, Km 125, 85 km SSE El Dorado, 1,032 m, (3). T. F. AMAZONAS, Tamatama, Río Orinoco, 135 m, (1). Total 4.

Proechimys semispinosus Tomes, 1860b:265.

Lowlands and foothills of northern and western Venezuela and southern T. F. Amazonas. Usually found on the ground (95 percent), occasionally in houses (4 percent), and rarely on logs and in caverns (1 percent); commonly in moist sites (92 percent) or infrequently in dry places (8 percent); in evergreen forest (75 percent), brushy openings such as yards, pastures, orchards, and croplands (18 percent), deciduous and thorn forest (6 percent), and cloud forest (1 percent); 1-1,340 m (75 percent below 500 m; 96 percent below 1,000 m); bms-T (16), bs-T (31), bh-T (177), bmh-T (76), bs-P (21), bh-P (95), bmh-P (38), and bmh-MB (5).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (78). BARINAS, Altamira, 697-900 m, (33). CARABOBO, nr. Montalbán, 562-1,000 m, (42). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260-1,265 m, (5); nr. Mirimire and up to 14 km ENE Mirimire, 122-250 m, (31); Península de Paraguaná, 15 km SSW Pueblo Nuevo, Cerro Santa Ana, 530-615 m, (5); Río Socopito, 80 km NW Carora, 470-480 m, (15). GUÁRICO, Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (4). LARA, Caserio Boro, 10 km N El Tocuyo, 518 m, (14). MIRANDA, Curupao, 5 km NNW Guarenas, 1,160 m , (1); Parque Nac. Guatopo, 15 km NW Altagracia, 680 m, (1); 6 km SSE Río Chico, 1 m, (1). MONAGAS, Cueva del Guácharo, 5 km W Caripe, 1,010 m, (3); San Agustín, 5 km NW Caripe, 1,265-1,340 m, (3). SUCRE, 21 km E Cumaná, 15 m, (2); Manacal, 26 km ESE Carúpano, 180-575 m, (21). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (9); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (26); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1); Tamatama, Río Orinoco, 135 m, (54). TRUJILLO, La Ceiba, 48 to 52 km WNW Valera, 28-29 m, (5); 12 to 30 km NW and WNW Valera, 90-900 m, (16). YARACUY, Minas de Aroa, 20 km NW San Felipe, 390-395 m, (2). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 75 m, (1); El Rosario, 45 to 65 km WNW Encontrados, 37-95 m, (21); Kasmera, 21 km SW Machiques, 265-273 m, (33). CARABOBO, FALCÓN, and YARACUY, 10 to 19 km NW Urama, 25 m, (32). Total 459.

Proechimys sp. ?

Specimens collected: T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (3); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (9); Tamatama, Río Orinoco, 135 m, (3). Total 16.

Mesomys hispidus Desmarest, 1817:58.

Lowland forests of T. F. Amazonas. Found in trees or houses (94 percent) or rarely on the ground (6 percent); near streams and in other moist places (90 percent) or in dry sites (10 percent); in evergreen forest (89 percent) and in forest openings such as yards (11 percent); 130-155 m; bh-T (19) and bmh-T (2).

Specimens collected: T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (10); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (8); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 21.

Isothrix bistriata Wagner, 1845:146.

Southern T. F. Amazonas. Captured in trees (88 percent) or rarely on the ground (12 percent); near streams (100 percent); in evergreen forest (100 percent); 130-138 m; bh-T (9).

Specimens collected; T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (6); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (2); Tamatama, Río Orinoco, 135 m, (1). Total 9.

Echimys armatus I. Geoffroy, 1838:887.

Bolívar, T. F. Amazonas, and the eastern and western Llanos. Found in trees (87 percent) or on the ground (13 percent); near streams and in other moist areas (98 percent) or rarely in dry places (2 percent); in evergreen forest (91 percent) or in scattered trees in savanna (9 percent); 18-350 m; bs-T (4), bh-T (39), bmh-T (1), and bh-P (1) (91 percent in humid zones).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). BOLÍVAR, Río Supamo, 50 km SE El Manteco, 350 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (4). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (33); San Juan Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (5); Tamatama, Río Orinoco, 135 m, (1). Total 45.

Echimys semivillosus I. Geoffroy, 1838:887.

Central Llanos and base of the Península de Falcón. Captured in trees (98 percent) or on the ground (2 percent); near streams and in other moist areas (88 percent) or in dry places (12 percent); usually in thorn forest (90 percent), occasionally in scattered trees in savanna (8 percent), and rarely in evergreen forest (2 percent); 25-579 m; bms-T (45), bs-T (4), bh-T (1), and bs-P (2) (98 percent in dry zones).

Specimens collected: APURE, Río Cinaruco, 38 km NNW Pto. Páez, 76 m, (3). BOLÍVAR, Hato La Florida, 45 km SE Caicara, 65 m, (1). CARABOBO, 1 km SE Montalbán, 579 m, (2). FALCÓN, 19 km NW Urama, 25 m, (1). LARA, Caserio Boro, 10 km N El Tocuyo, 158-537 m, (45). Total 52.

Order CETACEA

Family PLATANISTIDAE

Inia geoffrensis Blainville, 1817:151.

T. F. Amazonas. Captured in rivers flowing through evergreen forest; 135-155 m; bh-T (2).

Specimens collected: T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1); Tamatama, Río Orinoco, 135 m, (1). Total 2.

Order CARNIVORA

Family CANIDAE

Urocyon cinereoargenteus Schreber, 1775: pl. 92.

Northwestern Venezuela. Captured in dry thorn forest; 537 m; bms-T (2).

Specimens collected: LARA, Caserio Boro, 10 km N El Tocuyo, 537 m, (2). Total 2.

Cerdocyon thous Linnaeus, 1766:60.

Scattered localities throughout Venezuela except in southern T. F. Amazonas. Found on the ground (100 percent); near streams and other moist areas (64 percent) or in dry sites (36 percent); in prairie or pasture (49 percent), marshes, croplands, yards, and orchards (15 percent), deciduous and thorn forests (19 percent), and evergreen and cloud forests (17 percent); 1-2,000 m (97 percent below 620 m); me-T (1), bms-T (7), bs-T (50), bh-T (10), bmh-T (7), bs-P (3), bh-P (7), bmh-P (2), and bh-MB (1).

Specimens collected: ANZOÁTEGUI, 14 km W Clarines, 100 m, (1). APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (3); Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (7); Pto. Páez to 38 km NNW Pto. Páez, 76 m, (8). BOLÍVAR, Hato San José, 20 to 23 km W and NW La Paragua, 297-309 m, (6); 56 km NE Icabarú, 905 m, (1). CARABOBO, Montalbán to 3 km SE and SW Montalbán, 598-618 m, (7). DTO. FEDERAL, Alto Ño León, 36 km WSW Caracas, 2,000 m, (1). FALCÓN, nr. Boca de Tocuyo, 13 km SE San Juan de los Cayos, 1 m, (1); Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (5); 18 km WNW Captárida, 40 m, (1); nr. Mirimire and up to 15 km NE Mirimire, 20-250 m, (6). LARA, Caserio Boro, 10 km N El Tocuyo, 518-537 m, (3). MIRANDA, 1 to 5 km E and S Río Chico, 1 m, (4). MONAGAS, San Agustín, 5 km NW Caripe, 1,200 m, (1); Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (4). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (2). T. F. AMAZONAS, 14 to 55 km SSE to SSW Pto. Ayacucho, 114-135 m, (14); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). TRUJILLO, 19 to 25 km N to NW Valera, 90-164 m, (7). ZULIA, El Rosario, 51 km WNW Encontrados, 37 m, (1); Río Negro, 8 km W Machiques, 250 m, (1). FALCÓN and YARACUY, 10 to 19 km NW Urama, 25 m, (3). Total 88.

Family URSIDAE

Tremarctos ornatus F. Cuvier, 1825: fasc. 50.

Táchira Andes. Killed by native hunters in moist cloud forest; 2,380 m; bmh-MB (2).

Specimens collected: TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,380 m, (2). Total 2.

Family PROCYONIDAE

Procyon cancrivorus G. Cuvier, 1798:113.

Scattered localities in northern and central Venezuela. Found on the ground (100 percent); near streams (100 percent); in evergreen forest (50 percent), swamp (33 percent), and deciduous forest (17 percent); 1-320 m; bms-T (1), bs-T (3), and bh-T (2).

Specimens collected: BOLÍVAR, Hato San José, 20 km W La Paragua, 320 m, (1). GUÁRICO, Embalse de Guárico, 10 km N Calabozo, 100 m, (1). MIRANDA, 13 km E El Guapo, 12 m, (1); 5 km E Río Chico, 1 m, (1). ZULIA, El Rosario, 51 km WNW Encontrados, 37 m, (1); nr. Río Limón, 7 km NW San Rafael de Mara, 1 m, (1). Total 6.

Nasua nasua Linnaeus, 1766:64.

Lowlands of Bolívar and T. F. Amazonas. Shot on the ground (67 percent) or in trees (33 percent); in moist areas (57 percent) or in dry sites (43 percent); in evergreen (71 percent) or deciduous forest (29 percent); 100-350 m; bs-T (4), bh-T (1), and bh-P (2).

Specimens collected: BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (1); Hato San José, 20 km W La Paragua, 324 m, (1); Km 33, 28 km SE El Dorado, 100 m, (1); Los Patos, 25 km SE El Manteco, 350 m, (2). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (1); Tamatama, Río Orinoco, 135 m, (1). Total 7.

Nasuella olivacea Gray, 1865:703.

Mérida and Táchira Andes. Captured on the ground (100 percent); in dry (60 percent) or moist sites (40 percent); in cloud forest (57 percent) and páramo (43 percent); 2,000-3,020 m; bmh-MB (2), bmh-M (2), and p-SA (3).

Specimens collected: MÉRIDA, Paramito, 3 km W Timotes, 2,000-3,020 m, (5). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,380 m, (2). Total 7.

Potos flavus Schreber, 1774:187.

Lowland (occasionally montane) humid forests throughout Venezuela. Captured in trees (100 percent); in moist (53 percent) or dry areas (47 percent); in evergreen forest (95 percent) and openings such as yards, orchards, and croplands (3 percent), or rarely in cloud (1 percent) and thorn forest (1 percent); 24-1,750 m (97 percent below 500 m); bs-T (4), bh-T (85), bmh-T (16), bs-P (2), bh-P (9), bmh-P (42), and bmh-MB (4).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (13). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (4); 15 km NE Icabarú, 800 m, (1); Río Supamo, 50 km SE El Manteco, 150 m, (1). CARABOBO, 9 km NW Montalbán, 900 m, (1). DTO. FEDERAL, Alto Ño León, 31 km WSW Caracas, 1,750 m, (3). FALCÓN, Cerro Socopo, 84 km NW Carora, 1,260 m, (1); nr. Mirimire to 14 km ENE Mirimire, 125-250 m, (4). SUCRE, Manacal, 26 km ESE Carúpano, 180-200 m, (4). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (42). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (2); 30 to 32 km S Pto. Ayacucho, 135 m, (3); Río Mavaca, 108 km SSE Esmeralda, 140 m, (2). ZULIA, nr. Cerro Azul, 33 km NW La Paz, 80 m, (3); El Rosario, 39 to 63 km WNW Encontrados, 37-125 m, (68). CARABOBO and FALCÓN, 6 to 19 km NW and N Urama, 25 m, (7). Total 162.

Bassaricyon gabbii J. A. Allen, 1876:21.

Lowlands of Zulia and T. F. Amazonas. Found in trees (100 percent); in moist evergreen forest (100 percent); 135-460 m; bs-T (1), bh-T (3), and bmh-P (1).

Specimens collected: TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); 30 km S Pto. Ayacucho, 135 m, (2); Río Mavaca, 108 km SSE Esmeralda, 140 m, (1). Total 5.

Family MUSTELIDAE

Mustela frenata Lichtenstein, 1831: pl. 42.

Monagas. Captured on the ground (83 percent) and in a tree (17 percent); in or near coffee in moist evergreen forest (83 percent) and in dry pasture (17 percent); 1,150-1,340 m; bh-P (6).

Specimens collected: MONAGAS, San Agustín, 5 km NW Caripe, 1,150-1,340 m, (6). Total 6.

Eira barbara Linnaeus, 1758:46.

Scattered localities in southern and western Venezuela. Found on the ground (100 percent); in moist (66 percent) or dry areas (33 percent); in evergreen (92 percent) or cloud forest (8 percent); 24-2,380 m; bh-T (7), bmh-T (2), bh-P (2), bmh-P (2), and bmh-MB (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). BARINAS, Altamira, 600 m, (1). BOLÍVAR, El Manaco, 56 to 59 km SE El Dorado, 150 m, (3). FALCÓN, 7 to 12 km ENE Mirimire, 120-200 m, (2). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,380 m, (2); Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); 35 km S Pto. Ayacucho, 195 m, (1). ZULIA, El Rosario, 45 to 51 km WNW Encontrados, 24-37 m, (3). Total 15.

Galictis vittata Schreber, 1776: pl. 124 (description 1777:447).

Lowland localities in northern Venezuela. Taken on the ground (100 percent); near streams or other moist areas (100 percent); in evergreen forest (67 percent) and in grassland (33 percent); 18-460 m; bs-T (1), bmh-T (1), and bmh-P (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1). TÁCHIRA, Las Mesas, 17 km NE San Juan de Colón, 460 m, (1). Total 3.

Conepatus semistriatus Boddaert, 1785:84.

Northern Venezuela. Captured on the ground (100 percent); usually in dry (71 percent) but also in moist areas (29 percent); in thorn forest (71 percent), pasture (19 percent), and evergreen forest (10 percent); 18-55 m; me-T (14), bms-T (1), bs-T (4), and bh-T (2).

Specimens collected: FALCÓN, Capatárida and 3.5-6 km NE Capatárida, 40-50 m, (14); Península de Paraguaná, 15 km SSW Pueblo Nuevo, 55 m, (1); 19 km NW Urama, 25 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (4). ZULIA, El Rosario, 51 km WNW Encontrados, 37 m, (1). Total 21.

Lutra longicaudis Olfers, 1818:233.

Lowland rivers in southern and western Venezuela. Found in streams and on streambanks (100 percent); in evergreen forest (100 percent); 37-145 m; bh-T (3) and bmh-T (1).

Specimens collected: T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1). ZULIA, El Rosario, 51 km WNW Encontrados, 37-50 m, (3). Total 4.

Pteronura brasiliensis Gmelin, 1788:93.

Llanos. Caught in a stream in tree-bordered savanna; 76 m; bs-T (1).

Specimen collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (1). Total 1.

Family FELIDAE

Felis concolor Linnaeus, 1771:522.

Scattered localities in central and western Venezuela. Taken on the ground (100 percent); in both dry (50 percent) and moist situations (50 percent); in evergreen (75 percent) and cloud forest (25 percent); 73-2,380 m; bs-T (1), bh-T (2), bh-MB (2), and bmh-MB (1).

Specimens collected: BOLÍVAR, Río Tiquire, 27 km ENE Maripa, 100 m, (1). MÉRIDA, 4 km E Tabay, 2,100 m, (2). TÁCHIRA, Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, 2,380 m, (1). ZULIA, Boca del Río de Oro, 60 WNW Encontrados, 73 m, (2). Total 6.

Felis onca Linnaeus, 1758:42.

Western and southern Venezuela. Captured in trees (67 percent) and on the ground (33 percent); in dry (50 percent) or moist sites (50 percent); in evergreen forest (100 percent); 37-350 m; bh-T (1), bmh-T (2), and bh-P (1).

Specimens collected: BOLÍVAR, Río Supamo, 50 km SE El Manteco, 350 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2). ZULIA, El Rosario, 51 km WNW Encontrados, 37 m, (1). Total 4.

Felis pardalis Linnaeus, 1758:42.

Lowlands throughout Venezuela. Usually taken on the ground (81 percent) but also in trees (19 percent); near streams or other moist areas (71 percent) or in dry situations (29 percent); in evergreen forest (72 percent), deciduous and thorn forest (14 percent), and in swamps, marshes, or pastures (14 percent); 2-350 m; me-T (1), bms-T (1), bs-T (6), bh-T (13), bmh-T (4), and bh-P (6).

Specimens collected: ANZOÁTEGUI, 14 km W Clarines, 100 m, (1). APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (1). BOLÍVAR, El Manaco, 59 km SE El Dorado, 150 m, (4); nr. Caicara, 200 m, (1); Hato San José, 20 km W La Paragua, 324 m, (1); Los Patos, 25 to 28 km SE El Manteco, 350 m, (2); Río Supamo, 50 km SE El Manteco, 150-350 m, (3). CARABOBO, 10 km NW Urama, 25 m, (2). FALCÓN, Boca de Yaracuy, 28 km WNW Pto. Cabello, 2 m, (2); 13 km ENE Mirimire, 150 m, (1); Península de Paraguaná, 6 km N Pueblo Nuevo, 25 m, (1). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); Esmeralda, Río Orinoco, 135 m, (1); 32 km S Pto. Ayacucho, 135 m, (1); Tamatama, Río Orinoco, 135 m, (3). ZULIA, El Rosario, 45 km WNW Encontrados, 37 m, (2). Total 31.

Felis tigrina Schreber, 1775: pl. 106 (description 1777:396).

Sierra de la Costa and Bolívar. Caught on the ground (100 percent); in moist (75 percent) and dry situations (25 percent); in evergreen (75 percent) and deciduous forest (25 percent); 40-2,181 m; bs-T (1), bh-P (1), and bh-MB (2).

Specimens collected: BOLÍVAR, Hato La Florida, 63 km SE Caicara, 40 m, (1); Los Patos, 25 km SE El Manteco, 350 m, (1). DTO. FEDERAL, Pico Ávila, 5 km NNE and 6 km NNW Caracas, 2,013-2,181 m, (2). Total 4.

Felis wiedii Schinz, 1821:235.

Scattered lowland localities in northern and southern Venezuela. Taken on the ground (100 percent); in moist (75 percent) or dry sites (25 percent); in evergreen forest (100 percent); 125-854-m; bmh-T (2), bh-P (2), and bmh-P (1).

Specimens collected: BOLÍVAR, 43 km NE Icabarú, 854 m, (1). FALCÓN, 14 km ENE Mirimire, 125 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2). YARACUY, Minas de Aroa, 30 km NW San Felipe, 500 m, (1). Total 5.

Felis yagouaroundi E. Geoffroy, 1803:124.

Scattered lowland localities throughout Venezuela. Caught on the ground (60 percent) and in trees (40 percent); in dry pasture (75 percent) or thorn forest (25 percent); 18-600 m; me-T (1), bs-T (4), and bmh-P (1).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (1). BARINAS, Altamira, 600 m, (1). FALCÓN, Capatárida, 40 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (2). T. F. AMAZONAS, 55 km SSW Pto. Ayacucho, 119 m, (1). Total 6.

Order PERISSODACTYLA

Family TAPIRIDAE

Tapirus terrestris Linnaeus, 1758:74.

Forested lowlands of southern Venezuela. Taken on the ground (100 percent); most often in or near streams and in other moist areas (84 percent), and infrequently in dry situations (16 percent); in evergreen (91 percent) or deciduous forest (9 percent); 24-854 m; bs-T (2), bh-T (21), bmh-T (6), bh-P (3), and bmh-P (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). BOLÍVAR, Hato San José, 20 km W La Paragua, 303-350 m, (2); 43 km NE Icabarú, 854 m, (1); Los Patos, 25 km SE El Manteco, 350 m, (3). T. F. AMAZONAS, Acanaña, Río Cunucunuma, 48 km NW Esmeralda, 145 m, (1); Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (4); Boca Mavaca, 84 km SSE Esmeralda, 138 m, (1); Capibara, Brazo Casiquiare, 106 km SW Esmeralda, 130 m, (1); Esmeralda, Río Orinoco, 135 m, (18); 30 km S Pto. Ayacucho, 135 m, (1). Total 33.

Order ARTIODACTYLA

Family TAYASSUIDAE

Tayassu pecari Link, 1795:104.

Forested localities in southern Venezuela. Shot on the ground (100 percent); most often near streams and in other moist sites (59 percent) but frequently in dry habitats (41 percent); in evergreen forest (89 percent) and savanna (11 percent); 24-854 m (94 percent below 500 m); bs-T (1), bh-T (4), bmh-T (6), bh-P (6), and bmh-P (1).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (3). BOLÍVAR, Hato San José, 20 km W La Paragua, 324 m, (1); 43 km NE Icabarú, 854 m, (1); Km 33, 28 km SE El Dorado, 100 m, (3); Río Supamo, 50 km SE El Manteco, 150-350 m, (6). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (3); 28 km S Pto. Ayacucho, 135 m, (1). Total 18.

Dicotyles tajacu Linnaeus, 1758:50.

Forested lowlands of southern and western Venezuela. Taken on the ground (100 percent), occasionally in caverns and recesses between tree buttresses; near streams and other moist places (64 percent) or in dry habitats (36 percent); in evergreen (70 percent), thorn (19 percent), and deciduous forest (3 percent), or in savanna (8 percent); 24-600 m; bms-T (1), bs-T (10), bh-T (23), bmh-T (5), bh-P (3), and bmh-P (2).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (5). BARINAS, Altamira, 600 m, (2). BOLÍVAR, El Manaco, 56 to 70 km SE El Dorado, 150 m, (10); Hato San José, 20 km W La Paragua, 330 m, (1); Km 33, 28 km SE El Dorado, 100 m, (2); Río Supamo, 50 km SE El Manteco, 150-350 m, (2). FALCÓN, 13 to 17 km ENE Mirimire, 25-125 m, (11). T. F. AMAZONAS, Boca Mavaca, 84 km SSE Esmeralda, 138 m, (8); Esmeralda, Río Orinoco, 135 m, (2); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (1). Total 44.

Family CERVIDAE

Odocoileus virginianus Zimmermann, 1780:24 and 129.

Central and northern Venezuela. Found on the ground (90 percent) or in water (10 percent); in dry (53 percent) or moist sites (47 percent); in prairie (45 percent) or in thorn (25 percent), deciduous (15 percent), and evergreen forest (15 percent); 1-350 m; bs-T (15), bh-T (3), and bh-P (3).

Specimens collected: APURE, Hato Cariben, Río Cinaruco, 46 km NE Pto. Páez, 76 m, (2); Pto. Páez, 76 m, (1); Río Cinaruco, 48 km NW Pto. Páez, 76 m, (2). BOLÍVAR, Hato La Florida, 45 km ESE Caicara, 65 m, (2); Hato San José, 20 km W La Paragua, 300 m, (2); Los Patos, 25 km SE El Manteco, 350 m, (2). FALCÓN, nr. Mirimire and up to 15 km NE and ENE Mirimire, 50-200 m, (4). GUÁRICO, Hato Las Palmitas, 35 km SSW San Juan de los Morros, 181 m, (1). MIRANDA, Cúpira, 30 km E El Guapo, 100 m, (1); 6 km SSE Río Chico, 1 m, (1). MONAGAS, Hato Mata de Bejuco, 55 km SSE Maturín, 18 m, (1). T. F. AMAZONAS, San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (2). Total 21.

Mazama americana Erxleben, 1777:324.

Forested lowland localities in northwestern and southern Venezuela. Taken on the ground (97 percent) or in water (3 percent); in or near streams and in other moist areas (77 percent) or in dry sites (23 percent); in evergreen (78 percent) or deciduous forest (14 percent) and in croplands, pastures, and clearings around houses (8 percent); 24-500 m; bs-T (4), bh-T (41), bmh-T (3), and bh-P (20).

Specimens collected: APURE, Nulita, Selvas de San Camilo, 29 km SSW Santo Domingo, 24 m, (1). BOLÍVAR, El Manaco, 56 to 59 km SE El Dorado, 150 m, (27); Hato San José, 20 km W La Paragua, 300-306 m, (2); Icabarú, 473 m, (2); Km 33, 28 km SE El Dorado, 100 m, (3); Los Patos, 25 km SE El Manteco, 350 m, (12); Río Supamo, 50 km SE El Manteco, 150-350 m, (3). FALCÓN, 12 km ENE Mirimire, 240 m, (1). T. F. AMAZONAS, Belén, Río Cunucunuma, 56 km NNW Esmeralda, 150 m, (2); 32 km S Pto. Ayacucho, 126 m, (1); San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 155 m, (7). YARACUY, Minas de Aroa, 19 km WNW San Felipe, 500 m, (4). ZULIA, El Rosario, 45 km WNW Encontrados, 37 m, (3). Total 68.

Mazama gouazoubira G. Fischer, 1814:465.

Forests of Bolívar and Falcón. Found on the ground (100 percent); near streams and in other moist areas (67 percent) or in dry sites (33 percent; in evergreen forest (60 percent) thorn forest (20 percent), pastures and yards (13 percent), and deciduous forest (7 percent); 60-976 m (94 percent below 500 m); bs-T (5), bh-T (8), and bh-P (3).

Specimens collected: BOLÍVAR, 15 km SE El Dorado, 75 m, (1); El Manaco, 59 km SE El Dorado, 150 m, (7); Hato San José, 20 km W La Paragua, 330 m, (1); Icabarú to 51 km NE Icabarú, 473-976 m, (2); Los Patos, 25 km SE El Manteco, 350 m, (1). FALCÓN, 13 to 15 km NE and ENE Mirimire, 60-125 m, (4). Total 16.

Mazama sp. ?

Specimen collected: BOLÍVAR, Km 125, 85 km SSE El Dorado, 1,032 m, (1). Total 1.

GAZETTEER

The Smithsonian Venezuelan Project collected specimens at 102 localities. For each of these the gazetteer includes reference to a well-known map point, geographic coordinates, elevation, state, narrative description, Holdridge life zone, collectors, SVP numbers, kinds of specimens collected, dates of collections, and SVP locality code number.

All distances and geographic coordinates were determined from the following U.S. Air Force Operational Navigation Charts (scale 1:1,000,000): K-26, first edition, compiled 1965; K-27, first edition, compiled 1963; L-26, second edition, compiled 1966; and L-27, first edition, compiled 1965. All distances cited from Caracas were measured from the Plaza Venezuela, 10°30'N-66°53'W. Elevations were determined in the field with aircraft-type altimeters.

Most of the localities included several sublocalities at which collections were made. In all, 1,390 collecting sites were identified in specimen data, and names of 243 of these, in addition to the 102 primary locality names, appeared on specimen labels. In the gazetteer, these sublocalities are referenced to the primary localities in which they are included, without further description.

Acanaña (Río Cunucunuma), 48 km NW Esmeralda and 13 km SSW Belén, 3°32'N-65°48'W, 145 m (T. F. AMAZONAS). Indian village in valley of Río Cunucunuma.

Terrain hilly; mountains of 500 m or more nearby. Evergreen forest broken by trails and gardens around village. Holdridge classification: TROPICAL very humid forest (bmh-T). Collector: M. Tuttle. SVP numbers: 17176, 18587-18635, 19443, 19635, 26255-26263, 27896-27914 (80 mammals, purchased). Mar-Jun 1967. SVP locality 31.

Agua de Obispo, 2 km SSW Montalbán, 598 m (see Montalbán)

Agua Fría, 7 km NNE Altamira, 1,070 m (see Altamira)

Agua Santa (nr.), 23 to 25 km NW Valera, 90 m (see Valera)

Agua Viva (nr.), 19 to 23 km N Valera, 164 m (see Valera)

Agüide (nr.), 20 km NNE Mirimire, 1-5 m (see Mirimire)

Altamira (within 7 km of town center), 8°50'N-70°30'W, 600-1,070 m (BARINAS). Lower E slopes of Andes; very steep and rocky; almost no flat ground. Streams, largest 15-30 m wide, with v-shaped valleys, rocky beds, and fast-flowing, clear, cold water. Agricultural land (mostly in coffee and bananas), second growth evergreen forest (trees up to 10-15 m high), small areas of grass (1-2 m high), and bamboo surround Altamira. Nearest undisturbed forest several hours away by foot or horseback. Holdridge classification: PREMONTANE very humid forest (bmh-P). Collectors: A. Tuttle, Inquilla, Stromeyer, and Peterson (1 specimen). SVP numbers: 4361, 33152-34387, 40863 (1,224 mammals, 10 birds, 3 reptiles, 1 amphibian). 30 Mar 1966, 13 Dec 1967-13 Jan 1968. SVP locality 37.

Alto Ño León, 31 to 36 km WSW Caracas, 10°26'N-67°10'W, 1,665-2,050 m (DTO. FEDERAL and MIRANDA). Upper reaches of Sierra de la Costa, with steep to moderately steep slopes, small streams, occasional rock outcrops, and rich, loamy, humus-laden soil, or clay-loam with limited humus. Dominant original vegetation either cloud forest, with trees 15-20 m high, abundant epiphytes, and very dense 3-4 high subcanopy of shrubs, vines, ferns, and forbs; or, on S slopes, drier, more open forest with fewer epiphytes. All now much altered by human intrusion: much clearing and burning, many roads and footpaths, and many small coffee and vegetable farms. Remnants of mature cloud forest with numerous rotting stumps and logs of large trees; scrubby second growth cloud forest with many tree ferns; openings cleared from cloud forest mostly covered with dense ferns and shrubs, 1-1.5 m high, and little grass. S slope second growth forest with scattered trees and cover of bamboo, forbs, and brambles. Holdridge classification: LOWER MONTANE humid forest (bh-MB) and LOWER MONTANE very humid forest (bmh-MB). Collectors: Peterson, Naranjo, Ojasti, D. Peacock, and R. Peacock. SVP numbers: 3708-3745, 12462, 13058-13098 (69 mammals, 10 birds, 1 amphibian). 19-23 Dec 1965, 5 Mar and 24-27 May 1967. SVP locality 54.

Aragüita, 0.5 km SSE Montalbán, 598 m (see Montalbán)

Aroa (nr.), 30 km NW San Felipe, 500 m (see Minas de Aroa)

Begón, 1 km S Altamira, 794 m (see Altamira)

Belén (Río Cunucunuma), 56 km NNW Esmeralda, 3°39'N-65°46'W (to 3°37'N-65°53'W and 3°43'N-65°42'W), 150 m (T. F. AMAZONAS). Broad, undulating valley bordered by cliff-sided mountains—Cerro Duida, Cerro Huachamacari, and Cerro Marahuaca. Streams numerous, sandy or rocky, fast flowing, clear or red, mostly sheltered by forest canopy. Forest nearly continuous, evergreen, dense, 18-36 m high, and mostly undisturbed. Village of Belén, with about 100 people, 18 huts, chickens and dogs, and clearings for banana, papaya, guava, yucca, etc., located at edge of prairie 0.5 km in diameter (with bunch grass 0.25-1 m high). Holdridge classification: TROPICAL very humid forest bmh-T). Collectors: M. Tuttle and Harder. SVP numbers: 15108-15780, 15947, 16090-16192, 16194-16548, 16550-16621, 16670-16676, 16836-16910, 16940-17175, 17177-17182, 17594 (1,506 mammals, 3 birds, 8 reptiles, 12 amphibians). 30 Dec 1966-21 Feb 1967, 5 Apr 1967. SVP locality 25.

Betijoque (nr.), 20 km WNW Valera, 134 m (see Valera)

Birongo (Birongo to 4 km SW Birongo), 10°-29'N-66°16'W, 60-195 m (MIRANDA). Eastern foothills of Sierra de la Costa. Steep ridges, rocky soil, and swift, rocky streams. Primary forest evergreen, with canopy at 35-40 m, subcanopies at 25 and 15 m, and ground cover of ferns and low herbs. Much land cleared for cacao, oranges, and bananas, leaving scattered large shade trees, grassy openings, and patches of low shrubs. In addition to trapping and netting, bats were collected from Cueva Alfredo Jahn near Birongo and Cueva Walter Dupouy near Capaya. Holdridge classification: TROPI-

CAL humid forest (bh-T). Collectors: Peterson, Brown, Matson, and Naranjo. SVP numbers: 21154-21371, 21373-21426, 21661, 21799-21808 (282 mammals, 1 reptile). 20-23 & 28 Jan 1968. SVP locality 78.

Boca de Apure, 0.5 km SSW Montalbán, 598 m (see Montalbán)

Boca de Río Cunucunuma, 49 km W Esmeralda, 3°11'N-66°00'W, 135 m (T. F. AMAZONAS). Evergreen forest on river plain. Holdridge classification: TROPICAL humid forest (bh-T). Collector: M. Tuttle. SVP numbers: 19226-19229 (4 mammals, purchased). 20 May 1967. SVP locality 99-12.

Boca de Tigre, 5 km NW Caracas, 1,394 m (see Boca de Tigre Valley)

Boca de Tigre, 6 km NNW Caracas, 1,982-2,119 m (see Pico Ávila)

Boca de Tigre Valley, 5 km NW Caracas, 10° 32'N-66°54'W, 1,394-1,616 m (DTO. FEDERAL). Very damp, densely forested stream valley, about half way up inland slope of Sierra de la Costa, near Clavelitos. Trees averaging 15 m high, with many vines; ferns and some grass along stream 2.5 m wide. Holdridge classification: LOWER MONTANE humid forest (bh-MB). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 822-852, 858-869, 872-888, 901-905, 948-969, 1066, 1093-1094 (90 mammals). 27 and 30 Aug and 7 Sep 1965. SVP locality 3.

Boca de Yaracuy, 28 km WNW Pto. Cabello, 10°35'N-68°15'W, 2 m (FALCÓN). Flat, sandy, very hot and humid lowland within 1 km of coast. Collecting in open coconut palm groves, thick scrubby thorny forest (trees 4-12 m high), vine-tangled swamp, and in large grassy and weedy openings with scattered shallow ponds and occasional palms and shrubs. Patches of bare, nearly white sand made even moonless nights rather light. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 1193-1563, 1565-1578 (228 mammals, 140 birds, 9 reptiles, 8 amphibians). 22 Sep-10 Oct 1965. SVP locality 4.

Boca del Río, 36 km W Porlamar, 10 m (see Isla Margarita)

Boca del Río de Oro, 60 km WNW Encontrados, 73 m (see El Rosario)

Boca Mavaca, 84 km SSE Esmeralda, 2°30'N-65°13'W (to 2°33'N-65°02'W and 2°23'N-65°16'W), 138 m (T. F. AMAZONAS). Undulating forested plain within 20 km radius of Boca Mavaca, including banks of Orinoco, Mavaca, and Manaviche rivers, all white water streams. Numerous smaller streams and occasional lagoons and shallow swamps. Scattered low hills. River banks high and steep, overgrown with vines and tree limbs. Forest evergreen, mature, mostly undisturbed; canopy often open near streams, otherwise dense, 10-35 m high; undergrowth dense (including many patches of *Heliconia* and scattered palms) except in seasonally flooded lowlying areas. Clearings around Indian villages with grass 1-2.5 m high, banana patches, and various fruit and nut trees. Holdridge classification: TROPICAL humid forest (bh-T). Collectors: M. Tuttle, A. Tuttle, Harder, and Peterson (1 specimen). SVP numbers: 6512-6731, 11249, 16661-16669, 16677-16835, 17183-17380, 17396, 17402-17408, 17412, 35783 (529 mammals, 17 birds, 36 reptiles, 12 amphibians, 3 other). 9-21 Feb and 10 Nov 1966, 1-27 Mar 1967. SVP locality 10.

Boquerón, 10 km WSW La Asunción, 47 m (see Isla Margarita)

Boquerón, 5 km NW Caripe, 1,180 m (see San Agustín)

Buena Vista (nr. Páramo de Tamá), 41 km SW San Cristóbal and 12 km SSE Las Delicias, 7°27'N-72°26'W, 2,350-2,430 m (TÁCHIRA). Hilly terrain on north facing slope at head of large, wide Andean valley. Numerous small (2-6 m wide), swift, rocky streams; Río Táchira nearby; occasional swampy and marshy areas. Mature cloud forest with discontinuous canopy of scattered trees 25-30 m high; subcanopy at 10-15 m, open or closed; many tree ferns, stilt palms, and thick clusters of tree bamboo; vines few and thin, or hanging from trees in abundance; shrub stratum 1.5 m high; moss and other epiphytes very abundant on trees and ground; abundant litter of logs, fallen trees, dead bamboo, and leaves. Virtually impenetrable clumps of vinelike bamboo dominant (choking out other vegetation), scattered throughout the forest, around fields, and forming thick canopies over streams. Clearings (formed by cutting and burning forest) with thick grass and clover, patches of neddlelike rushes, and clumps of ferns, herbs, low shrubs, and blackberries. Collecting at upper edge of agricultural clearing (pasture and cropland); cloud forest continuous on steep slopes from this point up to ridgetop páramo, 5 hours' walk distant. Holdridge classification: LOWER

MONTANE very humid forest (bmh-MB). Collectors: Peterson, Brown, and Matson. SVP numbers: 21810-22020 (195 mammals, 14 birds, 1 reptile, 1 other). 1-29 Mar 1968. SVP locality 80.

Buena Vista, 9 km SSW Pueblo Nuevo, 80-120 m (see Península de Paraguaná)

Cabecera del Caño Culebra (Cerro Duida), 40 km NNW Esmeralda, 3°30'N-65°43'W, 1,140-1,480 m (T. F. AMAZONAS). Uninhabited, trailless, and undisturbed Cerro Duida Plateau; drained mostly by Caño Culebra and Caño Negro, flowing northward to Río Cunucunuma, through complex of valleys and ridges. Caño Culebra mostly subterranean at head, although some tributaries surface at 1,830 m. Stream open and 0.5-1.5 m wide at 1,400 m; drops steeply to bench at 800 m, then falls over N rim of plateau. Surface composed of roots, leaves, and humus of varying thickness, capping rocks and concealing depressions and crevices; quaking and treacherous underfoot. Low, dense, scrubby summit forest (as seen at loc. 26, Caño Culebra) replaced at loc. 27 by island of high (12-20 m, occasionally 35 m) evergreen forest with slender trunks and branches mostly near tops, superficially similar to lowland forest of Cunucunuma Valley. Holdridge classification: LOWER MONTANE rain forest (bp-MB). Collectors: M. Tuttle and Harder. SVP numbers: 15934-15946, 15948-15997, 15999-16089, 16622-16633, 16637-16647, 16911-16939 (177 mammals, 29 birds). 25 Jan-13 Feb 1967. SVP locality 27.

Cabecera del Caño Negro (Cerro Duida), 32 km NW Esmeralda, 3°26'N-65°43'W, 1,225-1,830 m (T. F. AMAZONAS). Topography much like that at Cabecera del Caño Culebra. Ground densely covered with large, heavy-leaved plants holding quantities of water in leaf bracts. Scattered trees up to 12 m high, with large leaves and branches all along trunks. Footing so treacherous that Indians refused to work and camp had to be abandoned. Holdridge classification: LOWER MONTANE rain forest (bp-MB). Collectors: M. Tuttle and Harder. SVP numbers: 16634-16636, 16648-16660 (16 mammals). 14-17 Feb 1967. SVP locality 28.

Calabozo, 8°56'N-67°26'W, 100 m (GUÁRICO). Llanos. Holdridge clasification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP numbers: 24278-24296 (19 mammals, purchased). 11-13 Mar 1968. SVP locality 79-14.

Campo Grande, 51 km NE Icabarú, 976 m (see Icabarú)

Caño Agua Fría, 23 km NE Calabozo, 150 m (see Hato Los Leones)

Caño Azul, 65 km WNW Encontrados, 95 m (see El Rosario)

Caño Cariche (Río Orinoco), 92 km W Esmeralda, 3°05'N-66°23'W, 128 m (T. F. AMAZONAS). High evergreen forest on Orinoco Plain. Canopy nearly complete; scattered palms and vines; understory fairly open and consisting mostly of slender shrubs, 3-4 m high. Holdridge classification: TROPICAL humid forest (bh-T). Collector: Peterson. SVP number 11200 (1 mammal). 31 Oct 1966. SVP locality 99-13.

Caño Cauirima, 20 km SE Esmeralda, 135 m (see Esmeralda)

Caño Cuca, 14 km W Esmeralda, 135 m (see Esmeralda)

Caño Culebra (mouth), 60 km NNW Esmeralda, 150 m (see Belén)

Caño Culebra (Cerro Duida), 50 km NNW Esmeralda and 7 km SE Belén, 3°37'N-65°41'W, 750-825 m; a few specimens at 700 m and 1,795 m (T. F. AMAZONAS). North rim of Cerro Duida Plateau, where foamy, red water Caño Culebra, 5-8 m wide, falls over 300 m cliff. Plateau dissected by deep, steep-sided valleys with frequent waterfalls. High, exposed points burned by lightning fires. Cliff face and ledges clothed with grass, scattered small, scrubby trees, and tough ferns. At plateau rim, high tropical evergreen forest of valley grades abruptly into lower, drier, denser, scrubbier montane forest containing many low (6-9 m), leathery-leaved trees (very dense and branching along entire stem) and some taller trees, up to 12 m high (to 15 m in damp, protected valleys). Trees and rocks laden with epiphytes; open areas covered with dense growths of lichens; ground cover of grass, large-leaved succulents, and palms nearly everywhere abundant and often very dense. Holdridge classification: PREMONTANE rain forest (bp-P). Collectors: M. Tuttle and Harder. SVP numbers: 15781-15933, 15998, 16193 (155 mammals). 11 Jan-2 Feb 1967. SVP locality 26.

Caño Essa, 60 km NW Esmeralda, 150 m (see Belén)

Caño Guaviarito, 12 km WNW San Juan, Río Manapiare, 155 m (see San Juan, Río Manapiare)

Caño Iguapó, 10 km SE Esmeralda, 135 m (see Esmeralda)

Caño Macasi, 2 km ENE Capibara, 150 m (see Capibara)

Caño Majagua, ca. 25 km N San Juan, Río Manapiare, 155 m (see San Juan, Río Manapiare)

Caño Parucito, 9 km SSE San Juan, Río Manapiare, 155 m (see San Juan, Río Manapiare)

Caño Seta, 56 km NNW Esmeralda, 150 m (see Belén)

Caño Tamatama, 135 m (see Tamatama)

Capatárida (within 31 km of town center), 11°10'N-70°37'W (to 11°07'N-70°46'W and 10°54'N-70°41'W), 30-100 m (FALCÓN). Flat coastal desert, crossed by many streams, none of them permanently flowing; mixed sand and clay soil. Dominant vegetation low (3-8 m) thorny trees (many hollow), shrubs, and cacti, often very dense, with many vines. Trees larger where streams overflow during rains. Holdridge classification: TROPICAL thorny forest (me-T) and TROPICAL very dry forest (bms-T). Collectors: A. Tuttle, Inquilla, and Stromeyer. SVP numbers: 23646-23647, 43761-44412 (608 mammals, 18 birds, 28 reptiles). 19 Jun-3 Jul 1968. SVP locality 42.

Capibara (Brazo Casiquiare), 106 km SW Esmealda, 2°37'N-66°19'W, 130 m (T. F. AMAZONAS). Low-flying, forested plain, mostly permanently or seasonally flooded to depths of 0.5-3 m. High ground at time of collections, a few centimeters to about 1 meter above water level. Occasional monoliths and low rocky hills (disintegrated monoliths). Evergreen forest mostly lower than on upper Orinoco, but with patches of high forest. Dense stands of *Heliconia* to 10 m high; patches of low palm forest, rather open beneath, forming fairly complete canopy at 7-9 m. Collecting centered at old farm site on slight rise, inhabited until about 1955 by 12-15 families. Four hectares previously cleared for pasture and crops, had mostly reverted to second growth scrub, but two thatched roof huts, numerous fruit trees (still bearing), and small clearings with grass to 1.8 m high remained. Holdridge classification: TROPICAL humid forest (bh-T). Collectors: M. Tuttle and Harder. SVP numbers: 19260-19433, 19436-19442, 19444-19478, 19480-19634, 19636-19641, 19645-19646, 29007 (321 mammals, 11 birds, 12 reptiles, 22 amphibians, 14 other). 25 May-15 Jun 1967. SVP locality 33.

Caracas, 10°30'N-66°53'W (at Plaza Venezuela), 825-1,180 m (DTO. FEDERAL and MIRANDA). Upper portion of dry valley of Río Guaire and lower interior slopes of Sierra de la Costa. Most of area occupied by city of Caracas and its suburbs and all profoundly disturbed by human beings. Collecting among houses in Caracas for bats; along stream through deciduous scrub near Petare; and in semideciduous forest in the steep-sided ravine of Quebrada Chacaito (swift, rocky stream, many large boulders, evergreen trees up to 25 m, deciduous shrubs and smaller woody plants, thin grass in openings, and tall, dense grass on slopes above). Holdridge classification: PREMONTANE dry forest (bs-P). Collectors: M. Tuttle, A. Tuttle, Peterson, D. Peacock, and R. Peacock. SVP numbers: 752, 3772-3776, 13013-13057, 16549 (44 mammals, 6 amphibians, 2 other). 23 Aug 1965, 8 Jan and 17 Dec 1966, 14-18 May 1967. SVP locality 96.

Caserio Boro, 10 km N and 10 to 47 km NE El Tocuyo, 9°53'N-69°47'W to 10°02'N-69°26'W, 518-900 m (LARA). Upper portion of Río Tocuyo Basin near N base of Andes; mountainous to W of river, hilly or undulating to E; river 60 m wide; muddy. Most flat areas on valley floor planted to sugar cane (also some tomatoes and onions). Wild cane and scattered trees 18-24 m high in band 15-24 m wide on river bank. Uplands desertlike, with dry washes, dry, sandy soil, and low thorny forest dominated by acacias and cacti. Holdridge classification: TROPICAL very dry forest (bms-T), PREMONTANE thorny forest (me-P), and PREMONTANE dry forest (bs-P). Collectors: A. Tuttle, Inquilla, and Stromeyer. SVP numbers: 35000-35433, 44413-44999 (1,008 mammals, 2 birds, 11 reptiles). 14-24 Jul 1968. SVP locality 43.

Casiquiare Canal, 106 km SW Esmeralda, 130 m (see Capibara)

Cerro Azul, 33 to 40 km NW La Paz, 10°51'N-72°16'W, 75-80 m (ZULIA). Wide, flat valley of Río Cachiri (shallow and rocky, 30-40 m wide) in rolling, hilly country at upper edge of Maracaibo Plain, near northern terminus of Sierra de Perijá. Extensive clearing in five years prior to collecting had reduced formerly continuous deciduous forest to small scattered patches of much disturbed forest. Human population high; many roads and houses; land used for dairy pasture, banana plantations, and corn fields. Collecting in banana patches; cornfields overgrown with grass, weeds, and morning glories; and various kinds of deciduous forest, all with more or less discontinuous, open canopy, and all characterized by abundant rotting fallen trees; remnant high riverbank forest with trees 30-40 m high and many vines and epiphytes; scrub forest with scattered trees 20-25 m high, vines and epiphytes, open subcanopy at 10 m, scattered clusters of bamboo, dense shrubs 3 or 4 m high, patches of thorny, vinelike bamboo, and variable ground cover of low herbs and woody plants, interlaced with thorny vines; scrubby thorn forest 5 m high, with sparse low woody plants and herbs and grassy openings. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: Peterson, Brown, Matson, and Naranjo. SVP numbers: 23198-23418 (206 mammals, 11 reptiles, 4 amphibians). 7-16 Jun 1968. SVP locality 83.

Cerro Caridad, 6 to 13 km ENE Mirimire, 120-260 m (see Mirimire)

Cerro de Murciélagos, 1 km W Pto. Páez, 76 m (see Puerto Páez)

Cerro del Tigre, 20 km W La Paragua, 400 m (see Hato San José)

Cerro Duida (see Cabecera del Caño Culebra, Cabecera del Caño Negro, and Caño Culebra)

Cerro Matasiete, 3 to 4 km NE La Asunción, 100-425 m (see Isla Margarita)

Cerro Negro, 10 km NW Caripe, 1,520-1,690 m (see San Agustín)

Cerro Santa Ana, 15 km SSW Pueblo Nuevo, 500-650 m (see Península de Paraguaná)

Cerro Socopo, 84 km NW Carora, 10°28'N-70°48'W, 1,257-1,280 m (FALCÓN). Cerro Socopo, northern terminus of line of ridges separating arid interior basins from Maracaibo Plain. Extensive evergreen forest on inaccessible N slope; remainder of mountain cleared for agriculture. Other summits to S and SE nearly, if not entirely, denuded of forest. Cerro Cerrón, the highest, had little more than 25 percent of its cloud forest cap left in 1967 and that was being cut. Collecting in scrub cloud forest at head of sheltered valley, 1 km SE summit of Cerro Socopo. Scattered trees and palms up to 30 m high; small trees formed discontinuous subcanopy at 3-4 m; tree ferns numerous along streams; epiphytes and vines common; small shrubs and patches of grass provided dense ground cover; open areas with dense ferns 1.5 m high, scattered patches of grass, and widely scattered trees up to 20 m high. Holdridge classification: LOWER MONTANE very humid forest (bmh-MB). Collectors: Peterson, Brown, Matson, and Pine. SVP numbers: 22811-22899 (62 mammals, 13 birds, 14 amphibians). 13-18 May 1968. SVP locality 82 (subloc. 10-17).

Chaberú, 18 km NE Icabarú, 741 m (see Icabarú)

Chaparito, 14 km SSE Pto. Ayacucho, 119 m (see Puerto Ayacucho)

Churguata, 32 km SSE Pto. Ayacucho (see Puerto Ayacucho)

Cinco Rancho, 28 km NE Icabarú, 775 m (see Icabarú)

Clarines (14 km W Clarines), 9°57'N-65°18'W, 100 m (ANZOÁTEGUI). Arid plain with low deciduous forest and grassy openings. Holdridge classification: TROPICAL very dry forest (bms-T). Collector: Peterson. SVP numbers: 14712-14752 (41 mammals, purchased). 26 Jun and 3 Jul 1967. SVP locality 94-11.

Cojoro, 30 to 44 km NNE Paraguaipoa, 11°38'N-71°50'W, 5-50 m (ZULIA, Venezuela and GUAJIRA, Colombia). Flat to undulating coastal desert, with gravel and sandy-clay soil, and isolated low mountains, with large eroded rocks and ledges and very little soil. Many gullies and streams up to 15 m wide and 2-3 m deep, dry or with isolated pools, except after rare rains; wells brackish. Except in driest places, coastal plain covered with low, thin-stemmed, thorny bushes; cacti up to 5 m high (sometimes forming dense thickets); numerous small *Opuntia;* but usually no grass, weeds, or other ground cover except twigs and branches. Gullies and streambeds lined with thorny trees up to 5 m high, laced with many vines, and with sparse grass in openings. Mountains and drier lowland areas nearly bare of vegetation, with only occasional clumps of grass and scattered individual shrubs and cacti at 20-50 m intervals. Palm and banana plantations and fruit trees around houses and wells and abundant goats, sheep, burros, dogs, and house cats. Holdridge classification: TROPICAL thorny forest (me-T). Collectors: Peterson, Brown, Matson, and Naranjo. SVP numbers: 23419-23645, 24226 (203 mammals, 4 birds, 16 reptiles, 4 amphibians, 1 other). 19 Jun-1 Jul 1968. SVP locality 84.

Colonia Tovar (nr.), 36 km WSW Caracas, 2,000 m (see Alto Ño León)

Corocoro, nr. Cerro Yutaje, 18 km NE San Juan, Río Manapiare, 155 m (see San Juan, Río Manapiare)

Coromoto, 30 km S Pto. Ayacucho, 126 m (see Puerto Ayacucho)

Cucurito, 15 km N San Juan, Río Manapiare, 155 m (see San Juan, Río Manapiare)

Cucuyal, 14 km ENE Montalbán, 701 m (see Montalbán)

Cueva Alfredo Jahn, 160 m (see Birongo)

Cueva del Guácharo, 5 km W Caripe, 1,010 m (see San Agustín)

Cueva del Guano, 7 km W Pueblo Nuevo, 120 m (see Península de Paraguaná)

Cueva del Tigre, nr. Sotillo, 21 km E Cumaná, 40 m (see Cumaná)

Cueva La Tapia, 3 km N La Asunción, 50 m (see Isla Margarita)

Cueva Ricardo Zuloaga, 15 km SE Caracas, 548 m (see El Encontado)

Cueva Vieja, 10 km N El Tocuyo, 900 m (see Caserio Boro)

Cueva Walter Dupouy, 4 km SW Birongo, 195 m (see Birongo)

Cumaná (to 24 km E Cumaná), 10°26'N-64°02'W (to 10°28'N-64°08'W and 10°27'N-63°57'W), 1-50 m (SUCRE). Very dry, steep-sided coastal hills and narrow coastal plain; bare rock outcrops and boulders; numerous streams, reduced to isolated pools of water in dry season. Many roads and settlements; much of limited flat land planted to coconut palms, oranges, or bananas. Collecting in scrubby thorn forest of acacia, cactus, and thorny trees 10-20 m high, with many vines, shrubs to 5-8 m, and patches of grass; in overgrown coconut and orange groves with herbaceous and woody growth 2-5 m high, and wild cane 3-4 m high; in yards and chicken coops; and in tidal marsh with sedge 1-2 m high, patches of cane in wetter parts of marsh, and scattered small clumps of fleshy-leaved scrubby trees, 4-10 m high, in drier parts of marsh. Holdridge classification: TROPICAL very dry forest (bms-T). Collectors: Peterson, D. Peacock, and R. Peacock. SVP numbers: 11280-11356, 11713-12000 (343 mammals, 6 birds, 8 reptiles, 1 amphibian, 7 other). 7 Dec 1966-7 Jan 1967. SVP locality 67.

Cumbe, 1 km SW Altamira, 650 m (see Altamira)

Cumbre Canoabo, 9 km NE Montalbán, 657-773 m (see Montalbán)

Cúpira, 30 km E El Guapo, 10°10'N-65°42'W, 100 m (MIRANDA). Dry, scrubby, second growth deciduous forest at upper edge of coastal plain. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP number: 24819 (1 mammal, found dead on road). Jun 1967. SVP locality 99-16.

Curupao, 5 km NNW Guarenas, 10°31'N-66°-38'W, 1,130-1,190 m (MIRANDA). Lower S (interior) slope of Sierra de la Costa; steep-sided ridges with abundant moss and lichen-covered boulders and ledges; many small, fast-flowing streams. Continuous, mature, relatively undisturbed, evergreen forest above collecting area; much-disturbed deciduous forest and fruit orchards below. Collecting sites: 1) Near small aqueducts and 50x100 m reservoir at lower edge of mature, moist, fairly open, evergreen forest with larger trees 0.5 m dbh and 10-20 m high, twisted, and laden with vines and moss; shrubs up to 4 m; numerous ferns and herbs 0.1-2 m high; grass only along trails. 2) Orchard overgrown with vines, shrubs, and herbs, but upper canopy still composed almost entirely of mango, orange, and avocado trees; lower subcanopy of coffee and bananas. 3) Fruit orchard and patches of deciduous trees. Holdridge classification: PREMONTANE humid forest (bh-P). Collectors: Peterson, D. Peacock, and R. Peacock. SVP numbers: 10259-10543, 10546-10657 (391 mammals, 2 birds, 4 reptiles). 4-14 Oct 1966. SVP locality 64.

Dabajuro, 18 km SSW Capatárida, 75 m (see Capatárida)

Descanso, 56 km NE Icabarú, 905 m (see Icabarú)

El Blanquero, 45 km SSE Maturín, 18 m (see Hato Mata de Bejuco)

El California, 4 km NNW Montalbán, *ca.* 1,000 m (see Montalbán)

El Calvario, 0.1 km NNW Montalbán, 598 m (see Montalbán)

El Castaño, 1.2 km SE Montalbán, 598 m (see Montalbán)

El Central, 10 km NW Urama, 25 m (see Urama)

El Cobalongo, 7 km NNE Altamira, 900 m (see Altamira)

El Cruz, 37 km NW La Paragua, 298 m (see Hato San José)

El Dividive, 22 to 30 km NW Valera, 90 m (see Valera)

El Dorado (15 km SE El Dorado), 6°38'N-61°33'W, 75 m (BOLÍVAR). Low, undulating plain, sloping toward Río Cuyuni, with dense mixed forest (zone of transition between evergreen and deciduous). Holdridge classification: TROPICAL humid forest (bh-T).

Collectors: M. Tuttle and A. Tuttle. SVP numbers: 7950, 8978 (2 mammals). 6 May and 1 Jun 1966. SVP locality 18.

El Encantado, 13 to 15 km SE Caracas, 10° 27'N-66°47'W, 500-570 m (MIRANDA). Valley of Río Guaire between El Encantado and Los Naranjos. Steep slopes, frequent cliffs and outcrops, and numerous caves. Most caves small, dry, and dusty, but Cueva Ricardo Zuloaga with entrances 20x15 m in diameter, large rooms, long passages, dry or damp, much guano, and nesting oilbirds. Area clothed with low, dry, deciduous forest with few openings. Nearby ridge-tops with roads and houses, but valley largely uninhabited and accessible only on foot. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: Peterson, Parrish, Naranjo, Ojasti, Brown, and Matson. SVP numbers: 3777-3811, 21099-21153, 21429-21508 (170 mammals). 9 Jan 1966, 13-14 Jan 1968. SVP locality 77 (including loc. 55-13).

El Filo, 1 km SE Altamira, 600 m (see Altamira)

El Gavilán, 14 km SSE Pto. Ayacucho, 135 m (see Puerto Ayacucho)

El Guapo (13 km E El Guapo), 10°10'N-65°51'W, 12 m (MIRANDA). Coastal plain; evergreen forest with clearings for farms and small settlements. Holdridge classification: TROPICAL humid forest (bh-T). Collector: Peterson. SVP number: 3996 (1 mammal, found dead on road). 27 Feb 1966. SVP locality 99-10.

El Limón, 4 km NW Maracay, 10°17'N-67° 36'W, 524 m (ARAGUA). Interior basin; dry savanna, with tall grass and patches of deciduous trees. Holdridge classification: PREMONTANE dry forest (bs-P). Collector: Peterson. SVP number: 13008 (1 mammal). 22 Apr 1967. SVP locality 99-19.

El Limón, 48 km W Caracas, 380-398 m (see Hacienda Carapiche)

El Manaco, 56 to 68 km SE El Dorado, 6°19'N-61°19'W to 6°09'N-61°22'W, 150 m (a few specimens at 374 m) (BOLÍVAR). Low, undulating, densely forested plain with infrequent small permanent streams and ponds and occasional small swamps, bisected by all-weather highway; mountains rise abruptly at S edge of area. Evergreen forest, 20-40 m high, largely undisturbed except for small settlements, farms, and road construction clearings along highway. Collecting in clearings, at rainwater pools in bare gravel pits, in gardens and fruit groves, on stream and swamp margins, and to a limited extent in deep forest. Holdridge classification: TROPICAL humid forest (bh-T). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 7863-7871, 8180, 8498, 8500, 8951, 8962-8977, 8979, 8983, 8997-8999, 9006-9026, 9031, 9033, 9035-9949 (940 mammals, 8 birds, 6 reptiles, 2 amphibians, 16 other). 13 May-8 Jul 1966. SVP locality 20 (including locality 21; overlaps locality 19 at higher elevations).

El Mango, 11 km NE Güiria, 30-90 m (see Ensenada Cauranta)

El Merey, 1 km SE Montalbán, 598 m (see Montalbán)

El Milagro, 4 km NW El Nula, 24 m (see Nulita)

El Mundo Nuevo de Surukún, 43 km NE Icabarú, 854-964 m (see Icabarú)

El Nudo, 13 km NE Icabarú, 817-881 m (see Icabarú)

El Nula (= San Camilo), 3 km S Nulita, 24 m (see Nulita)

El Pauji, 21 km NE Icabarú, 851 m (see Icabarú)

El Pico, 1 km SSW Montalbán, 598 m (see Montalbán)

El Polo, 15 km NE Icabarú, 800 m (see Icabarú)

El Raudal, 33 km S Pto. Ayacucho, 195 m (see Puerto Ayacucho)

El Rodeo, 35 km NE El Tocuyo, 634 m (see Caserio Boro)

El Rosario, 39 to 65 km WNW Encontrados, 9°09'N-72°36'W (to 9°13'N-72°34'W, 9°11'N-72°48'W, and 9°07'N-72°46'W), 24-125 m (ZULIA). Basin of Lago de Maracaibo, within 10 km of N bank of Río Catatumbo (125-200 m wide), from edge of lakeshore swamps to Colombian frontier at Río de Oro. Terrain low and flat in E, to undulating, to hilly near Río de Oro; lower portions flood seasonally, leaving sloughs and damp areas in dry season. Mature evergreen forest 18-30 m high, with many palms and vines, relatively free of underbrush in areas prone to flooding; dense, scrubby, second growth forest averages 10-15 m high. Patches of *Heliconia* 2.5-3 m high and grass to 1 m high in sloughs and old streambeds. Whole region much disturbed by oil wells, pipe lines, and associated roads; logging operations; clearing and burning for agriculture; and road building (Maracaibo-San Cristóbal highway, under construction, bisected area). Holdridge classification: TROPICAL humid forest (bh-T). Collectors: A. Tuttle, Inquilla, and Stromeyer. SVP numbers: 40968-42199, 42493-42715 (1,443 mammals, 5 birds, 7 reptiles). 24 Feb-3 Apr 1968. SVP locality 39.

El Rosario, 1.2 km SW Montalbán, 618 m (see Montalbán)

El Tocuyo (see Caserio Boro)

El Vigía (see Mesa Bolívar)

Embalse de Guárico, 10 km N Calabozo, 9°01'N-67°26'W, 100 m (GUÁRICO). Llanos. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP numbers: 21509-21528, 21570-21598, 21603, 21665-21666, 21668, 21671, 21674, 21676-21798 (178 mammals, purchased). 22 and 27 Jan 1968. SVP locality 79-10.

Ensenada Cauranta, 9 to 12 km NE Güiria, 10°38'N-62°15'W, 1-100 m (SUCRE). Coastal lowlands and low mountains on S side of Península de Paria. Coastal area flat and dry, with numerous small intermittent streams. Mountain ridges steep sided and humid, with small, swiftly flowing rocky streams, and many large boulders. Entire area heavily populated, broken up into small farms, and converted to agriculture. Most of lowlands covered with coconut palm and banana groves (also mangos, oranges, and sugar cane); some farms, poorly tended, had grass up to 2 m high and patches of shrubs and vines. Unfarmed lowland areas mostly quite dry and grown up to dense, low, thorny shrubs. Isolated small patches of deciduous forest had trees 8-15 m high, interior free of underbrush, and edges with dense growths of herbs and small woody plants and trees completely blanketed with tangles of vines. In mountains, evergreen forest remnant consisted of scattered epiphyte-laden trees 23-30 m high, mostly shading orchards of cacao and bananas (some overgrown with small shrubs and vines and dense ground cover of ferns and herbs). Second growth vegetation very thick and moist. Occasional small, moist, limestone caves. Holdridge classification: TROPICAL dry forest (bs-T) and PREMONTANE humid forest (bh-P). Collectors: Peterson, D. Peacock, and R. Peacock. SVP numbers: 13099-13643 (517 mammals, 12 birds, 6 reptiles, 6 amphibians, 4 other). 2-19 Jun 1967. SVP locality 71.

Esmeralda (Río Orinoco, to 20 km SE and 14 km W Esmeralda), 3°11'N-65°33'W (to 3°03'N-65°28'W and 3°09'N-65°40'W), 135 m (T. F. AMAZONAS). Low-lying Orinoco Plain, with scattered low hills, and occasional rock mounds (up to 60 m) with numerous small caves and crevices formed by jumbled rock slabs. Evergreen forest 30-35 m high, with open understory of forbs and slender shrubs. Small patches of savanna with dense grass up to 1 m high and many slender termite mounds up to 1.5 m high. A mission and airstrip at Esmeralda and numerous Indian villages nearby. Holdridge classification: TROPICAL humid forest (bh-T). Collectors: Peterson, M. Tuttle, and Harder. SVP numbers: 11202-11248, 11250-11279, 18969-18994, 18998-19002, 19142-19155 (122 mammals). 3-11 Nov 1966, 11-16 May 1967. SVP locality 32 (and 66).

España, 57 km WNW Encontrados, 61 m (see El Rosario)

Estación Biológica de los Llanos, 9 to 14 km SE Calabozo, 8°52'N-67°23'W, 100-115 m (GUÁRICO). Llanos. Tall grass (1 m), with scattered, low, scrubby trees (*Curatella*, *Byrsonima*, and *Bowdichia*), and islands of forest (mata) up to 500 m in diameter. Matas with closed canopy of small trees (8 m high) and thick-trunked trees (12 m high); substratum sparse in interior, dense and almost impenetrable on edges, with bunch grass, scattered herbs, and small woody plants to 50 cm high, and shrubs (some spiny, 2 m). Streams bordered by scrubby gallery forest with thin-stemmed trees 4-6 m high forming complete canopy; scattered large trees (to 25 m), spiny shrubs, and vines; grass in openings. Soil gravelly, sandy-clay, with little humus. Collecting in savanna and matas and on station lawn (with close-mowed grass and scattered shade trees about 12 m high). Holdridge classification: TROPICAL dry forest (bs-T). Collectors: Peterson, Naranjo, Brown, and Matson. SVP numbers: 4842, 24570-24800 (216 mammals, 1 bird, 12 reptiles, 3 amphibians). 28 Aug 1966, 16-23 Aug 1968. SVP locality 86.

Guasdualito (10 km WNW Guasdualito, nr. Río Sanare), 7°16'N-70°45'W, 100 m (APURE). Low hills; marshes, patches of forest, and prairie. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP numbers: 3969-3970 (2 reptiles, found dead on road). 13 Feb 1966. SVP locality 99-17.

Guasipati (5 km NNW Guasipati), 7°31'N-61°55'W, 190 m (BOLÍVAR). Dry hilly terrain with patches of savanna and vine-laden deciduous forest. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: M. Tuttle and A. Tuttle. SVP numbers:

7872-7873, 7875-7949 (76 mammals, 1 reptile). 24-29 Apr 1966. SVP locality 16.

Guatopo (Parque Nacional Guatopo), 10 to 35 km NE, N, and NW Altagracia, 10°11’N-66°31’W and 10°03’N-66°27’W to 9°55’N-66°19’W, 300-740 m (GUÁRICO and MIRANDA). Crest and S slopes of Serranía del Interior, facing the Llanos. Low, steep-sided ridges; numerous small rocky streams; clay or clay-loam soil, very slippery in rainy season. Area largely forested, much of it relatively little disturbed, but collecting was mostly in abandoned agricultural land in various stages of reversion to forest (evergreen at higher elevations, deciduous at lower). Typically, grass high (to 1.5 m) and dense in openings and along trails; herbs and small woody plants (0.2-1.5 m); shrubs to 5 m; individual trees and thickets of *Cecropia* common; scattered larger (to 30 m), older trees; many trees and shrubs (coffee, bananas, oranges, etc.) still surviving from agricultural era. Along streams at lower elevations clumps and thickets (to 10 m high) of bamboo common. Holdridge classification: TROPICAL dry forest (bs-T), TROPICAL humid forest (bh-T), and PREMONTANE humid forest (bh-P). Collectors: Peterson, D. Peacock, R. Peacock, and Naranjo. SVP numbers: 191-192, 4901-4999, 10000-10084, 10086-10258 (338 mammals, 5 birds, 9 reptiles, 1 amphibian, 6 other). 24 Jul 1965, 16 Sep-2 Oct 1966. SVP locality 63.

Guayabal, 28 km S Pto. Ayacucho, 135 m (see Puerto Ayacucho)

Hacienda Bajo Seco, 3 km S Río Chico, 1 m (see Río Chico)

Hacienda Bejuquero, 1 km S Río Chico, 1 m (see Río Chico)

Hacienda Carapiche (nr. El Limón), 48 km W Caracas, 10°29’N-67°19’W, 380-398 m (DTO. FEDERAL). Steep-sided valley on lower seaward slope of Sierra de la Costa, near mesic-xeric ecotone. Soil sandy to loamy clay, with many boulders and smaller stones. Largely evergreen forest formed epiphyte-laden, semiclosed canopy at 20 m; shrub subcanopy at 3 m; ground cover of low herbs and scattered ferns. Forest much disturbed around roads and farms (corn, bananas, coffee, poultry), where there was dense second growth scrub. Clearings with dense grass up to 2.5 m high, together with many herbs and scattered trees. Holdridge classification: PREMONTANE humid forest (bh-P). Collectors: Peterson, D. Peacock, R. Peacock, and Naranjo. SVP numbers: 4651-4841 (186 mammals, 1 bird, 2 reptiles, 2 amphibians). 18-22 Aug 1966. SVP locality 61.

Hacienda El Rodeo, 35 to 40 km NW La Paz, 75-80 m (see Cerro Azul)

Hacienda El Tigre, 39 km NW La Paz, 80 m (see Cerro Azul)

Hacienda Elvira, 10 km NE Altagracia, 630 m (see Guatopo)

Hacienda Guanital, 14 km E Cumaná, 1 m (see Cumaná)

Hacienda Guaracayal, 24 km E Cumaná, 1 m (see Cumaná)

Hacienda La Aurora, 794 m (see Altamira)

Hacienda La Cañada, 3 km SW Montalbán, 618 m (see Montalbán)

Hacienda La Concordia, 9 km NE Güiria, 7 m (see Ensenada Cauranta)

Hacienda La Guapa, 6 km SSE Río Chico, 1 m (see Río Chico)

Hacienda La Rosa, 12 km NE Güiria, 90-100 m (see Ensenada Cauranta)

Hacienda Los Chuárez, 3 km NNE La Asunción, 42-70 m (see Isla Margarita)

Hacienda Los Mamones, 16 km NW Barbacoas, 9°34’N-67°05’W, 228 m (GUÁRICO). Llanos. Undulating plain, with irrigation canals and small lagoons. Savanna fenced for pasture, subject to grazing and frequent burning. Scattered deciduous trees (to 15 m) and clumps of shrubs; many palmettolike palms; and dry grass and forbs. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: Peterson, Parrish, and Naranjo. SVP numbers: 3997-4007 (4 mammals, 2 birds, 5 amphibians). 2 Mar 1966. SVP locality 92.

Hacienda Misisí, 13 to 15 km E Trujillo, 9°21’N-70°18’W, 1,769-2,360 m (TRUJILLO). Ridgetop and N facing slope of steep-sided, well-watered Andean valley. Soil rich loam, with thick humus layer. Low, scrubby cloud forest on ridge crest, higher forest on slopes; trees in exposed places distorted by persistent high winds. High forest with trees 15-20 m high and vines, moss, lichens, orchids, and other epiphytes; tree fern and shrub subcanopy 5-6 m high; ground stratum of grass, moss, ferns, and forbs to 1 m high; dense thickets of bamboo in openings. In dry season, dead leaves, grass, and bamboo generally concealed fallen trees and boulders; moss and lichens covered exposed rocks, logs, and trees. Occasional small farms within forest; entire valley floor and lower slopes cleared for pasture and crops such as corn, wheat, onions, and potatoes. Hunting pressure heavy. Collecting in 27x2 km block of primary cloud forest, possibly the last remaining in Trujillo State; in recently cleared and second growth cloud forest; and on stream banks, along stone walls, and in patches of shrubs in cultivated areas. Holdridge classification: LOWER MONTANE humid forest (bh-MB) and LOWER MONTANE very humid forest (bmh-MB). Collectors: Peterson and Parrish. SVP numbers: 3813-3909 (87 mammals, 9 birds, 1 reptile). 18-29 Jan 1966. SVP locality 56.

Hacienda Pedogal, 1 km S Río Chico, 1 m (see Río Chico)

Hacienda Platanal, 33 km NW La Paz, 75-80 m (see Cerro Azul)

Hacienda Quetepe, 16 km E Cumaná, 1-5 m (see Cumaná)

Hacienda San Antonio, 34 km NW La Paz, 80 m (see Cerro Azul)

Hacienda San Fernando, 3 km NW Caripe, 1,165-1,460 m (see San Agustín)

Hacienda Socopito, 80 km NW Carora, 470-480 m (see Río Socopito)

Hacienda Tucusito, 3 km SW Caripe, 854 m (see San Agustín)

Hacienda Tunantal, 21 km E Cumaná, 1-20 m (see Cumaná)

Hacienda Valle Verde, 46 km WNW Valera, 29 m (see La Ceiba)

Hato Cariben (nr. Santa María), 32 to 46 km NE Pto. Páez, 6°33'N-67°13'W, 76 m (APURE). Relatively flat, sandy plain (mostly seasonally flooded), with patches of low, rolling hills of soft sand, and occasional isolated low rocky hills or rock domes; bounded on E by muddy Río Orinoco and on N by clear Río Cinaruco; frequent small, clear lagoons. Uplands covered with grass 15-60 cm high; stream courses, low damp areas, and lagoons bordered by dense forest 7.5-18 m high, with little ground cover; ecotone between forest and grassland usually rather sharp. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 5480-5637, 5639-6116 (607 mammals, 7 birds, 6 reptiles, 16 amphibians). 1 Dec 1965-11 Jan 1966. SVP locality 6.

Hato Destino, 30 to 33 km NW La Paragua, 300-306 m (see Hato San José)

Hato Juan Felipe, 53 km SSE Maturín, 18 m (see Hato Mata de Bejuco)

Hato La Costumbre, 45 km SSE Maturín, 18 m (see Hato Mata de Bejuco)

Hato La Florida, 38 to 63 km SE and SSE Caicara, 7°30'N-65°52'W to 7°25'N-65°39'W, 40-130 m (BOLÍVAR). Flat to undulating plain and steep-sided low mountains at southern edge of Llanos; many small streams, some reduced to dry beds with isolated pools in dry season; clay or sandy soil, often with pebbles or rocks; mountain slopes littered with huge boulders. Entire area savanna, bounded southward by evergreen forest. Collecting in: 1) open, pastured prairie with grass 1-2 m high, herbs 1-3 m, and scattered low shrubs; 2) belts of swampy or marshy evergreen forest bordering streams; clay soil saturated with water and with much standing water; trees, mostly palms, 10-15 m high; shrubs 3-4 m, herbs 0.5-2 m, and dense grass in openings; 3) belts of dry evergreen forest bordering dry stream beds, similar to swamp forest but with more vines and spiny plants and trees up to 25 m high; 4) steep mountainside savanna with low grass (0.5 m), some soft and woody herbs, and widely scattered stunted trees with twisted trunks and branches; 5) plots of banana, pineapple, and yucca. Human population mostly occupied with cattle raising. Many roads and trails. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: Peterson, D. Peacock, R. Peacock, and Furman. SVP numbers: 12741-12888, 12890-13003 (221 mammals, 19 birds, 17 reptiles, 3 amphibians, 2 other). 14 Apr-6 May 1967. SVP locality 70.

Hato La Vergareña, 26 to 32 km W and SW La Paragua, 306-310 m (see Hato San José)

Hato Larao, 1 km S Montalbán, 598 m (see Montalbán)

Hato Las Palmitas, 35 km SSW San Juan de los Morros, 9°36'N-67°27'W, 181 m (GUÁRICO). Rolling, hilly terrain in high Llanos; sandy-clay soil with much gravel; numerous small streams (reduced to isolated pools in dry season). Grassland on hills and forest (mata) in sheltered valleys. Grass in savannas 0.5 m (where grazed) to 1.5 m, with scattered small trees (6-8 m) and shrubs. Brushlands composed of thin-stemmed woody plants 1-5 m high, cactus of several varieties, numerous thick-stemmed vines, and scattered trees to 10 m high. Forest deciduous, very thick and difficult to penetrate, 8-15 m high; shrubs, forbs, and occasional vines not forming a definite subcanopy; seasonally very dry. Occasional weedy abandoned corn fields. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: Peterson, D. Peacock, R. Peacock, Naranjo, Brown, and Matson. SVP numbers: 4871-4900, 21003-21077, 21809 (101 mammals, 1 bird, 1 reptile, 3 amphibians). 3-4 Sep 1966, 3-7 Jan and 10 Feb 1968. SVP locality 62.

Hato Los Leones (Caño Agua Fría), 23 km NE Calabozo, 9°03'N-67°16'W, 150 m (GUÁRICO). Llanos. Undulating tall grass savanna, with scattered patches of upland forest and narrow bands of thin scrubby forest bordering streams. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 9960-9962 (3 mammals). 20 Jul 1966. SVP locality 23.

Hato Mata de Bejuco, 55 km SSE Maturín, 9°19'N-62°56'W, 18 m (MONAGAS). Llanos. Sandy plain, extensively flooded to depths of 0.5-1 m during rainy season. Grass (25-50 cm high), mostly in clumps, on higher ground; thorny, vine-laden forest (9-12 m high), mostly lacking ground cover, in bands 150-300 m wide along streams; scattered palms on damp ground. Land divided into large ranches (hatos); areas of better soil fenced and cultivated, or used for dry season pasture; numerous small settlements along roadways. Collecting on both sides of Río Tigre (60 m wide) near Highway 8 crossing. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: A. Tuttle and Pine. SVP numbers: 7874, 9963-9999, 15000-15073, 15075-15082, 15085-15106, 43445-43499, 43512-43593, 43595-43760 (417 mammals, 5 birds, 16 reptiles, 7 amphibians). 23 Apr and 1-11 Aug 1966, 2-11 Jun 1968. SVP locality 24 (and 41).

Hato San José, 20 to 37 km NW, W, and SW La Paragua, 6°49'N-63°29'W (to 6°58'N-63°36'W and 6°44'N-63°27'W), 297-400 m (BOLÍVAR). Flat to undulating plain and isolated low mountains; sandy or clay soil; occasional lagoons and numerous small streams, mostly reduced to isolated pools in dry season. Two basic habitats: isolated savannas and continuous evergreen forest. Typical mature evergreen forest with tree canopy at 30-35 m and shrub subcanopy at 5-10 m; decaying logs on ground; little underbrush. Second growth forest with mixture of evergreen and deciduous plants; scattered taller trees up to 35 m; smaller trees 15-25 m; very dense undergrowth of bamboo (4-6 m) and saplings (4-8 m); vines, brambles, and grass 2-4 m high. Brushland with thick clumped grass 0.2-1.5 m high, scattered trees (3-4 m), shrubs (1.5-2.5 m), woody weeds and brambles (1-1.5 m). Savannas with scattered trees and shrubs, or open and treeless on uplands and with bands of forest up to 200 m wide along streams; trees mostly evergreen and including many palms; subcanopy at about 8-10 m and shrubs 2-3 m; numerous vines; rotting logs and leaves on ground; many vines and shrubs leafless in dry season. Cattle raising and lumbering the dominant human disturbances; many roads and trails. Holdridge classification: TROPICAL dry forest (bs-T) and TROPICAL humid forest (bh-T). Collectors: Peterson, D. Peacock, R. Peacock, and Furman. SVP numbers: 12365-12460, 12463-12739 (308 mammals, 42 birds, 21 reptiles, 2 other). 26 Feb-11 Apr 1967. SVP locality 69.

Hato Santa Barbara, 58 km SSE Maturín, 18 m (see Hato Mata de Bejuco)

Hotel Humboldt, 5 km NNE Caracas, 2240 m (see Pico Ávila)

Icabarú (Icabarú to 56 km NE Icabarú), 4°20'N-61°46'W to 4°35'N-61°19'W, 473-982 m (BOLÍVAR). S edge of Gran Sabana near Brazilian boundary. Hilly to mountainous (sheer-sided, flat-topped mesas visible to N). Soil light, sandy, and rocky in savanna; red and rocky in forest; caves abundant. Streams numerous, up to 20 m wide, clear or red. Some large tracts of evergreen forest, but most forest in isolated blocks or in strips along streams, with savanna intervening. Mature forest 10-30 m high; mostly lacking dense undergrowth; some with many vines; some quite damp, with ferns and moss covering trees, vines, and rocks. Savanna with bunch grass about 1 m high, scattered bushes 0.5-3 m high, and occasional dense patches of ferns. Collecting in forest and savanna along road between Icabarú and Sta. Elena, and in caves, fruit groves, gardens, and thatched roofs of houses in Indian villages. Holdridge classification: TROPICAL dry forest (bs-T), PREMONTANE humid forest (bh-P), and PREMONTANE very humid forest (bmh-P). Collectors: A. Tuttle, Inquilla, Stromeyer, and Yunker. SVP numbers: 42716-43444, 43500-43511 (705 mammals, 16 birds, 17 reptiles, 3 amphibians). 24 Apr-19 May 1968. SVP locality 40.

Independencia, 23 km NE Icabarú, 824 m (see Icabarú)

Ipapure, 35 km NNE Paraguaipoa, 15 m (see Cojoro)

Isla Cudauaca, 7 km SE Esmeralda, 135 m (see Esmeralda)

Isla Margarita, 11°03'N-63°51'W (to 10°59'N-64°11'W and 10°55'N-63°53'W), 2-425 m (NUEVA ESPARTA). Island, about 65x25 km, on Continental Shelf in Caribbean, about 25 km N mainland; several low (less than 1,000 m), steep-sided mountains, and large flat to hilly coastal plain; many small streams, most reduced to dry washes during much of the year. Habitats include desert, with scattered, low (to 4 m), thorny shrubs and cacti without ground cover or underbrush; sand dunes with scattered thorny shrubs, cacti, and clumps of low grass and prostrate herbs and woody plants; low (6-10 m), scrubby, thorn forest, with many shrubs (2-4 m high) and cover of spiny vines; rocky, grassy (1-1.5 m high) mountain slopes; humid mountain-top cloud forest of stunted evergreen trees (4-7 m high), heavily laden with moss and other epiphytes, with herbs 1-2 m high in openings, and thick humus layer of rotting logs and leaves, but little soil. Most habitats disturbed by dense human population and much of island farmed: coconuts, bananas, mangos, oranges, lemons, pineapples, corn, sugar cane, etc. Holdridge classification: TROPICAL scrub desert (md-T), TROPICAL thorny forest (me-T), TROPICAL very dry forest bms-T), PREMONTANE dry forest (bs-P), and PREMONTANE humid forest (bh-P). Collectors: Peterson, D. Peacock, and R. Peacock. SVP numbers: 11357-11399, 12001-12364 (316 mammals, 46 birds, 18 reptiles, 10 amphibians, 17 other). 5 Jan-13 Feb 1967. SVP locality 68.

Isnotú, 12 km WNW Valera, 900-930 m (see Valera)

IVIC (Instituto Venezolano de Investigaciones Científicas), 15 km SW Caracas, 10°24'N-66°58'W, 1,460-1,665 m (DTO. FEDERAL and MIRANDA). Steep sides and moderately sloping top of interior ridge overlooking Caracas; sandy-clay soil with few stones; numerous small, swift, rocky streams; occasional small swampy areas. Originally probably covered with cloud forest; now much disturbed, converted to open grassland, with second growth evergreen scrub on slopes, and small, isolated tracts of remnant cloud forest on ridge-tops; numerous roads, trails, and buildings. Open areas with very dense, coarse grass to 1.5 m, mixed with ferns and scattered clumps of shrubs to 4 m. Most collecting in cloud forest, with trees 25-30 m, laden with vines, orchids, and bromeliads; subcanopy at 10 m; abundant ground cover of low herbs and ferns. Holdridge classification: PREMONTANE humid forest (bh-P) and LOWER MONTANE very humid forest (bmh-MB). Collectors: Peterson, Brown, and Matson. SVP numbers: 13004, 14753-14790, 21428 (39 mammals, 1 amphibian). 10 Oct 1966, 17-31 Oct 1967, 18 Jan 1968. SVP locality 74.

Juncalito, 18 km WSW Capatárida, 75 m (see Capatárida)

Kasmera, 21 km SW Machiques, 9°59'N-72°-43'W, 265-275 m (ZULIA). Eastern base of Sierra de Perijá. Collecting at biological station in wide, flat-bottomed valley of Río Yasa, a fast-flowing, rocky stream about 15 m wide, bordered by steep slopes and cliffs; occasional caves. Valley floor with second growth evergreen scrub about 4 m high; many stumps and logs, very dense growth of shrubs, vines, and *Heliconia;* scattered trees up to 30 m high. Station yard on riverbank with lawn, clumps of low shrubs, banana and papaya plants, and scattered grapefruit trees. Second growth evergreen forest on ridge-side with canopy at 25 m, subcanopy of scrubby trees at 10 m; vines, moss, and bromeliads abundant and often covering trunks and branches of trees. Holdridge classification: TROPICAL humid forest (bh-T). Collectors: Peterson, Brown, Matson, and Yunker. SVP numbers: 22021-22050, 22052, 22054-22199, 22600-22734 (285 mammals, 11 birds, 15 reptiles, 1 other). 8-24 Apr 1968. SVP locality 81 (subloc. 10-18).

Kilometer 33, 28 km SE El Dorado, 6°30'N-61°30'W, 100 m (BOLÍVAR). At evergreen edge of evergreen-deciduous ecotone on densely forested, undulating plain. Holdridge clasification: TROPICAL humid forest (bh-T). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 9000-9002 (3 mammals). 14-27 MAY 1966. SVP locality 22.

Kilometer 40, 19 km NW Urama, 25 m (see Urama)

Kilometer 67, 56 km SE El Dorado, 150 m (see El Manaco)

Kilometer 74, 59 km SE El Dorado, 150 m (see El Manaco)

Kilometer 88, 68 km SSE El Dorado, 150 m (see El Manaco)

Kilometer 125, 68 to 85 km SSE El Dorado, 5°59'N-61°26'W to 6°09'N-61°22'W, 193-1,165 m (mostly at 1,032 m) (BOLÍVAR). Deep valleys and steep ridges (occasional cliffs), near head of Río Venamo (4-8 m wide), between lowland plain and Gran Sabana; bisected by a single, new, all-weather highway. Dense, moist, luxuriant forest (12-24 m high), virtually undisturbed except on roadsides (ferns, grass, moss, and shrubs 1-2 m high there); all potential growing places festooned with orchids, ferns, mosses, and other epiphytes. Ground saturated, rocky, with little cover except for abundant moss-covered boulders and fallen trees. Collecting on roadside, in road construction clearings, along streams, and to a limited extent in dense forest. Holdridge classification: TROPICAL humid forest (bh-T) and PREMONTANE very humid forest (bmh-P). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 7951-8179, 8181-8334, 8336-8497, 8499, 8501-8950, 8952-8961, 9027-9030, 9032, 9034 (937 mammals, 66 birds, 4 reptiles, 5 amphibians). 8 May-8 Jun 1966. SVP locality 19 (overlaps locality 20 at lower elevations).

La Aguada, 2 km SSE La Asunción, 41-63 m (see Isla Margarita)

La Asunción, 3 km NE, 295-360 m (see Isla Margarita)

La Bellaca, 600 m (see Altamira)

La Blanquita, 4 km N El Nula, 24 m (see Nulita)

La Carbonera, 6 to 12 km SE La Azulita, 8°38'-N-71°21'W, 1,870-2,190 m (MÉRIDA). Disturbed cloud forest on N facing slope of large Andean valley. Most large trees had been recently removed; shrub stratum (up to 8 m) and scattered trees (to 20 m) remained; grass and ferns in openings. Holdridge classification: LOWER MONTANE very humid forest (bmh-MB). Collectors: Peterson and Parrish. SVP numbers: 4466-4544 (59 mammals, 19 birds, 1 other). 21-27 Apr 1966. SVP locality 59.

La Ceiba, 46 to 53 km WNW Valera, 9°28'N-71°04'W, 16-29 m (TRUJILLO). Flat alluvial plain bordering Lago de Maracaibo near mouth of Río Motatán. Dikes keep river about 4 m higher than plain. Lake shore relatively dry, with short grass and scattered palm trees. Four km-wide band behind lake shore permanently flooded marsh and swamp forest with dense growth of *Heliconia,* cattaillike plants, broad-leaved grass, and trees 15-20 m high. Areas bordering inland edge of swamp subject to extensive seasonal flooding; formerly covered with deciduous forest 20-30 m high, with subcanopy of spiny palms, and dense ground cover of spiny palms and succulents; mostly cleared for pasture and crops during 20 years prior to collections; primary forest remains only in small isolated tracts on swamp margins. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: Peterson, Flanigan, Taylor, and Young. SVP numbers: 2547-2551, 3550, 3552-3633, 3635-3701, 3703, 3992-3995 (131 mammals, 4 birds, 17 reptiles, 6 amphibians, 2 other). 3 Sep and 26 Oct-7 Nov 1965, 19 Feb 1966. SVP locality 53.

La Chiricoa, 3 km NE El Nula, 24 m (see Nulita)

La Colonia, 55 km NE Icabarú, 905-923 m (see Icabarú)

La Concordia, 47 km NE El Tocuyo, 592 m (see Caserio Boro)

La Copa, 4 km NW Montalbán, 1,446-1,537 m (see Montalbán)

La Coromoto, 7 km SE Tabay, 3,070-3,410 m (see Tabay)

La Cristalina, 5 km N El Nula, 24 m (see Nulita)

La Cumbre (nr.), 7 to 10 km ENE Mirimire, 200 m (see Mirimire)

La Danta, 31 km SSE Capatárida, 100 m (see Capatárida)

La Encrucijada, 18 km S El Sombrero, 9°14'N-67°02'W, 200 m (GUÁRICO). Llanos. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP number: 24228 (1 mammal, found dead on road). 25 May 1968. SVP locality 99-15.

La Guardia, 18 m (see Isla Margarita)

La Isla, 37 km NNE Paraguaipoa, 15 m (see Cojoro)

La Laguna, 5 km NW Caripe, 1,165-1,365 m (see San Agustín)

La Leonera, 3 km W Montalbán, 900 m (see Montalbán)

La Mucuy, 4 km E Tabay, 2,077-2,127 m (see Tabay)

La Pastora (nr.), 11 to 19 km ENE Mirimire, 20-400 m (see Mirimire)

La Puerta, 14 km ENE Montalbán, 767 m (see Montalbán)

La Quinta, 0.5 km SW Altamira, 697 m (see Altamira)

La Rinconada, 63 WNW Encontrados, 125 m (see El Rosario)

La Soledad, 5 km SW Altamira, 794 m (see Altamira)

La Trinidad, 9 km NW Montalbán, 900 m (see Montalbán)

La Vecinidad, 10 km WNW La Asunción, 19 m (see Isla Margarita)

La Vega del Río Santo Domingo, 2 km SW Altamira, 620 m (see Altamira)

La Villa, 32 km NE Pto. Páez, 76 m (see Hato Cariben)

La Voluntad, 14 km NE Montalbán, 1,007 m (see Montalbán)

La Yuca, 2 km SE Altamira, 600 m (see Altamira)

Laguna Guara, 15 km SSW San Juan, Río Manapiare, 155 m (see San Juan, Río Manapiare)

Laguna Verde, 9 km SE Tabay, 3,430-3,830 m (see Tabay)

Lagunillas (1 km NE Lagunillas), 8°30'N-71°-22'W, 915 m (MÉRIDA). Arid Andean valley; with steep slopes, dry streams, sandy-clay soil, numerous boulders and rock outcrops, scattered trees and shrubs to 20 m high, many cacti to 6 m high, and abundant forbs. Holdridge classification: PREMONTANE dry forest (bs-P). Collector: Peterson. SVP numbers: 4357-4358 (2 reptiles). 27 Mar 1966. SVP locality 91.

Las Matas, 5 km S Montalbán, 598 m (see Montalbán)

Las Mesas, 17 km NE San Juan de Colón, 8°-10'N-72°10'W, 300-460 m (TÁCHIRA). Western foothills of Andes, near head of plain of Lago de Maracaibo. Holdridge classification: PREMONTANE very humid forest (bmh-P) Collector: Peterson. SVP numbers: 21078-21098, 21427, 21599-21602, 21604-21660, 21662-21664, 21667, 21669, 21672, 21675, 22200-22582, 22584-22599, 24229-24277, 24297-24334, 24473-24478, 24546-24569, 24801-24810, 24820 (617 mammals, purchased). Jan-Jul 1968. SVP locality 79-12.

Las Queseras, 20 km S Pto. Ayacucho, 135 m (see Puerto Ayacucho)

Los Alpes, 35 km NW Altagracia, 300 m (see Guatopo)

Los Hatos, 4 km NE Capatárida, 40 m (see Capatárida)

Los Jebes, 11 km SW Capatárida, 60 m (see Capatárida)

Los Naranjos (nr.), 15 km SE Caracas, 500 m (see El Encantado)

Los Papayos, 7 km SW Montalbán, 598 m (see Montalbán)

Los Patos, 25 km SE El Manteco, 7°11'N-62° 22'W, 350 m (BOLÍVAR). Upland plain in zone of transition between savanna and evergreen forest; scattered small ponds and farms. Holdridge classification: PREMONTANE humid forest (bh-P). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 7364-7565, 7568-7593, 7620, 7710-7713, 7725-7770, 7772-7776, 7785-7792, 7814, 7820-7823, 8980-8982, 8984-8996, 9003-9005, 9950-9959, 35710 (302 mammals, 2 birds, 23 amphibians). 5-15 Apr (plus purchases up to 11 Jul) 1966. SVP locality 14.

Los Venados, 4 km NNW Caracas, 10°32'N-66°54'W, 1,400-1,739 m (DTO. FEDERAL). Old coffee finca, now part of Parque Nacional El Ávila; about halfway up inland slope of Sierra de la Costa, overlooking Caracas; mostly gentle slopes; numerous small, rocky, swift-flowing streams (Río Anauco and Quebrada Guayabal). Collecting mostly within 1,000 m of park headquarters: lawns, livestock pens, open weedy areas, fairly dry to rather moist second growth forest. Holdridge classification: LOWER MONTANE humid forest (bh-MB). Collectors: M. Tuttle, A. Tuttle, Peterson, Flanigan, Handley, Tipton, and Young. SVP numbers: 1-190, 193-618, 639-640, 1133-1146 (595 mammals, 37 birds). 21 Jul-15 Aug 1965. SVP locality 1.

Manacal, 26 km ESE Carúpano, 10°37'N-63° 01'W, 170-575 m (SUCRE). Crest of low mountains at base of Península de Paria. Ridgetops fairly level, but slopes steep; small, swift, rocky or sandy streams numerous, mostly seasonal at lower elevations; soil mostly clay; some areas with boulders and cliffs. Human population high and virtually all land cultivated, predominantly with coffee and cacao, but also with bananas, corn, mangos, and avocados. Collecting in: 1) Evergreen forest, with trees 10-25 m high; open very dense shrub subcanopy 3-5 m; numerous vines and epiphytes; and grass and herbs 1.5 m (very dense to absent). 2) Remnant evergreen forest with original tree canopy but natural subcanopy replaced by coffee or cacao; well-tended and clean, or with ground cover of ferns, grass, herbs, and vines. 3) Overgrown meadow, with dense coarse grass, herbs, small woody plants, and vines to 2 m high; and scattered shrubs 2-4 m. 4) Yards in village, with houses, lawns, gardens, fruit trees, shrubs, weeds, chickens, ducks, pigs, and donkeys. Holdridge classification: PREMONTANE dry forest (bs-P) and PREMONTANE humid forest (bh-P). Collectors: Peterson, D. Peacock, R. Peacock, and Tipton. SVP numbers: 14299-14711 (403 mammals, 7 birds, 1 reptile, 2 other). 18 Jul-4 Aug 1967. SVP locality 73.

Maurá, 46 km NE Icabarú, 800 m (see Icabarú)

Mesa Bolívar (nr.), 22 km SSE El Vigía, 8°26'-N-71°34'W, 690 m (MÉRIDA). East facing slope of large Andean valley. Scattered deciduous trees and shrubs with vines; clumps of *Cecropia;* grass. Holdridge classification: PREMONTANE dry forest (bs-P). Collector: Peterson. SVP number: 4016 (1 mammal, found dead on road). 8 Mar 1966. SVP locality 97.

Middle Refugio, 6 km ESE Tabay, 2,550-2,710 m (see Tabay)

Minas de Aroa, 19 to 30 km NW San Felipe, 10°25'N-68°54'W, 380-500 m (YARACUY). Near head of Río Aroa, on NW flank of Sierra de Aroa. Steep-sided canyons, often with sheer walls; rocky, sandy-clay soil with many boulders and outcrops; rocky, boulder-strewn, fast-flowing streams, up to 4 m wide. Lower edge of evergreen mountain forest, reduced to second growth scrub with thick underbrush and scattered large trees or to forest with discontinuous canopy of trees 25-35 m high; subcanopy of shrubby palms and scattered trees 4-15 m; scattered low herbs; many vines and bromeliads. Occasional small patches of bananas, coffee groves, and small fields; low herbs, particularly legumes, abundant in openings. Collecting mostly in and around buildings, caves, mine shafts, and slag piles of abandoned copper mine. Holdridge classification: PREMONTANE humid forest (bh-P). Collectors: Peterson, Brown, and Matson. SVP numbers: 20279, 20290-20807, 20809-21002 (707 mammals, 4 birds, 1 amphibian, 1 other). 30 Nov-23 Dec 1967. SVP locality 76.

Mirimire (Mirimire to 20 km NNE to ESE Mirimire), 11°12'N-68°37'W (to 11°08'N-68°38'W, 11°10'N-68°44'W, and 11°20'N-68°42'W), 1-400 m (FALCÓN). Undulating to level lowlands and isolated low, steep-sided limestone ridges with cliffs and many small dry or moist caves and crevices (1-12 m high, 20-100 m deep); sandy-clay soil; numerous small streams. Evergreen forest on ridges; low, dry, deciduous thorn forest in lowlands; thickly settled, but farms small and openings discontinuous; crops included lemons, oranges, mangos, bananas, and corn. Upper canopy of evergreen forest at 25-30 m, discontinuous; subcanopy continuous at 10 m; many thorny vines and epiphytes; ground cover of low herbs and woody plants; tough, coarse grass in openings. Evergreen forest continued along streams into lowlands, but trees only about 12 m high, with subcanopy at 8 m, and thick underbrush of vines, thorny plants, and herbs. Deciduous thorn forest thick, low (6-12 m), with many epiphytes and tall cacti, and understory of woody shrubs, thorny plants, and low grasses. Lagoons near coast bordered by mangroves. Holdridge classification: TROPICAL very dry forest (bms-T), TROPICAL dry forest (bs-T), and PRE-MONTANE humid forest (bh-P). Collectors: Peterson, Brown, and Matson. SVP numbers: 14791-14807, 14809-14999, 20000-20278, 20280-20289, 22583, 24811-24818 (488 mammals, 4 birds, 7 reptiles, 4 amphibians, 3 other). 9 Nov-4 Dec 1967 (additional sporadic collections, Aug 1967-Feb 1968). SVP locality 75.

Montalbán (within 14 km of town center), between 10°09'N-68°21'W, 10°14'N-68°12'W, and 10°17'N-68°21'W, 562-1,537 m (CARABOBO). Fertile basin, rimmed except S by mountains, highest to N and NW. Human population high and small settlements and roads numerous. Most of basin's floor pastured or cultivated; oranges dominant crop; also mangos, bananas, coffee, papayas, tobacco, and sugar cane; "gamaloti" grass up to 1.8 m high. Mature (9-12 m high), wet cloud forest, with palms and ferns on higher mountaintops; vines, moss, ferns, bromeliads, and orchids plentiful, especially on NW slopes; ferns (up to 1.8 m) and grass abundant where trees had been cut. Lower mountain slopes with patches of mature evergreen forest, 9-18 m high; elsewhere second-growth forest and scrub dominant. Holdridge classification: PREMONTANE dry forest (bs-P), PREMONTANE humid forest (bh-P), and PREMONTANE very humid forest (bmh-P). Collectors: A. Tuttle, Inquilla, and Stromeyer. SVP numbers: 31801-33151, 35434-35478 (1,335 mammals, 15 birds, 36 reptiles, 10 amphibians). 31 Oct-6 Dec 1967, 31 Jul-8 Aug 1968. SVP locality 36 (and 44).

Montero, 2 km ENE Montalbán, 598 m (see Montalbán)

Moracoy, 16 km SSW San Juan, Río Manapiare; 155 m (see San Juan, Río Manapiare)

Morganito, 70 km SSW Pto. Ayacucho, 161 m (see Puerto Ayacucho)

Morocoy, 65 km SSW Pto. Ayacucho, 161 m (see Puerto Ayacucho)

Moruy, 15 km SSW Pueblo Nuevo, 45-90 m (see Península de Paraguaná)

Novito, 19 km WSW Machiques, 10°02'N-72°43'W, 1,131-1,200 m (ZULIA). Lower E slopes of Sierra de Perijá, overlooking valley of Río Negro. Steep slopes and numerous small streams. Evergreen forest remnant with canopy at 25-30 m and scattered larger trees to 40 m, serving as shade for coffee and bananas; sparse ground cover of grass and weeds; numerous decaying logs, leaves, and fallen trees; many vines in trees; openings with spiny, nettlelike plants, dense ferns, and large-leaved succulents. Collecting around small ridge-top village surrounded by coffee and banana plantations, lemon groves, and pastures. Holdridge classification: PREMONTANE very humid forest (bmh-P). Collectors: Matson and Yunker. SVP numbers: 22735-22810 (73 mammals, 3 birds). 27 Apr-7 May 1968. SVP locality 81 (subloc. 19-25).

Nulita (Selvas de San Camilo), 29 km SSW Sto. Domingo, 7°19'N-71°57'W, 24 m (APURE). Well-watered, rocky, undulating plain near head of Río Sarare (at western edge of Selvas de San Camilo). Streams small, rocky or sandy, mostly swift flowing; marshes and ponds infrequent. Collecting mostly in second-growth evergreen forest, 12-24 m high, with numerous palms, and in land recently cleared for pasture and crops (such as yucca, bananas, coffee, and cacao). Fruit trees fairly abundant. Fallow fields overgrown with grass and weeds, and burned forest grown up to very dense grass, weeds, and shrubs, 1-2 m high. In nearby undisturbed forest, trees 25-45 m high, laden with moss and vines. Holdridge classification: TROPICAL very humid forest (bmh-T). Collectors: A. Tuttle, Inquilla, and Stromeyer. SVP numbers: 34388-34437, 34439-34999, 40000-40862, 40864-40967, 42200-42492 (1,802 mammals, 42 birds, 25 reptiles, 1 amphibian, 1 other). 17 Jan-20 Feb 1968. SVP locality 38.

Orocodones, 6 km NS Capatárida, 40 m (see Capatárida)

Paparo, 7 km N Río Chico, 1 m (see Río Chico)

Paramito, 3 to 4 km W Timotes, 8°59'N-70°46'W, 2,000-3,605 m (MÉRIDA). Mérida Andes. Steep upper SW slope of Motatán Valley near its head. Clear, rapid, boulder-filled streams; numerous rock outcrops; rocky clay-loam soil; many boulders. Frost common. Páramo at high level elevations and on exposed ridges, typified by low (to 0.5 m) grass, mat-forming plants, forbs, moss, and ferns, all more or less dominated by "frailejones" (*Espeletia*). Some páramo areas with low (2-3 m), bushy, small-leaved shrubs (solitary, in thickets, or forming nearly complete canopy), usually draped with lichens. Scrubby cloud forest in protected ravines and at lower elevations, with irregularly spaced shrubs and trees 6-10 m high; open to nearly closed canopy; ground cover of forbs, ferns, mosses, lichens, and brambles; and boulders, fallen trees, roots, trunks, and branches of standing trees festooned with epiphytes. Whole area much disturbed by human population: burned, overgrazed (cattle, sheep, goats, burros, horses), criss-crossed with foot paths and stone walls, cultivated (potatoes, wheat, corn), and overhunted. Holdridge classification: MONTANE very humid forest (bmh-M) and SUBALPINE páramo (p-SA). Collectors: Peterson and Parrish. SVP numbers: 3910-3968, 3971-3991, 35671-35688, 35730-35731, 35791-35799 (99 mammals, 8 birds, 1 reptile, 1 other). 3-16 Feb 1966. SVP locality 57.

Paría, 25 km S Pto. Ayacucho, 114 m (see Puerto Ayacucho)

Parque Nacional Guatopo, 15 to 21 km NW Altagracia, 610-740 m (see Guatopo)

Península de Paraguaná, 6 to 25 km S, SW, and N Pueblo Nuevo, 11°50'N-69°59'W (to 11°49'N-70°06'W, and 12°00'N-69°56'W), 13-650 m (FALCON). Isolated arid peninsula; mostly flat or gently undulating, but with range of low hills and steep-sided mountain, Cerro Santa Ana; connected to mainland by low, narrow, sparsely vegetated isthmus. Soil sand or sandy-clay, quite rocky in spots; occasional small limestone caverns. Many small windmill-fed artificial ponds and tanks; streams small, intermittent, dry or with stagnate algae-covered pools much of year. Lowland plain clothed with desert scrub, varying from sparse and scattered to very dense; dominated by low (8-10 m) thorn trees (*Mimosa*) commonly spaced 3-15 m apart, clusters (30-50 m in diameter) of *Opuntia*, and 1-2 m high shrubs; scattered tree cacti (*Cereus*), small trees, and terrestrial bromeliads; little ground cover except for cacti, logs, branches, and twigs. Forest slightly higher, but still scrubby, in sheltered places in hills. Much of plain cleared for pasture or crops and overrun by goats, cattle, dogs, cats, and high human population. Mountaintop cloud-shrouded and capped with cloud forest on N and W slopes; large-crowned, evergreen trees formed closed canopy at 20 m, and thin-stemmed trees an open subcanopy at 10 m; vines, mosses, lichens, and other epiphytes very abundant; ground nearly covered by thorny terrestrial bromeliads and scattered ferns and small woody and herbaceous plants; soil dark brown, humus filled, sandy-clay; many moss-covered boulders. Transition from thorn forest to cloud forest abrupt. Holdridge classification: TROPICAL thorny forest (me-T), TROPICAL very dry forest (bms-T), and PREMONTANE very humid forest (bmh-P). Collectors: Peterson, Brown, and Matson. SVP numbers: 23648-24026, 24028-24225, 24227 (548 mammals, 15 birds, 12 reptiles, 3 amphibians). 5 Jul-2 Aug 1968. SVP locality 85.

Perai-Tepuí, 41 km NE Icabarú, 982 m (see Icabarú)

Petaquire, 31 km WSW Caracas, 1,750 m (see Alto Ño León)

Petare, 10 km E Caracas, 825 m (see Caracas)

Pico Ávila (= Hotel Humboldt and vicinity), 5 km NNE to 6 km NNW Caracas, 10°33'N-66°52'W, 1,982-2,288 m (DTO. FEDERAL and MIRANDA). Crest of Sierra de la Costa above Caracas; steep slopes; very cool, damp, and windy. Trapping and netting near Hotel Humboldt on Pico Ávila and westward along ridge-top, past Boca de Tigre, to vicinity of Pico Galipán: lawns and gardens with deep, heavy sod; damp, low, evergreen forest; pockets of cloud forest with stunted, moss-laden trees and many palms and bamboos. Holdridge classification: LOWER MONTANE humid forest (bh-MB) and LOWER MONTANE very humid forest (bmh-MB). Collectors: M. Tuttle, A. Tuttle, and Handley. SVP numbers: 619-638, 641-751, 753-821, 853-857, 870-871, 889-900, 906-947, 970-1065, 1067-1092, 1095-1132, 1147-1192, 1564 (411 mammals, 57 birds). 17 Aug-27 Sep 1965. SVP locality 2.

Piedra Virgen, ca. 70 km SSE El Dorado, 374 m (see Kilometer 125)

Platanillal, 30 km S Pto. Ayacucho, 119 m (see Puerto Ayacucho)

Portochuelo, 4 km NW La Asunción, 50 m (see Isla Margarita)

Potrerito, 2 km SE Montalbán, 598 m (see Montalbán)

Pueblo Nuevo (6 km N Pueblo Nuevo), 25 m (see Península de Paraguaná)

Puente Rincón, 1 km SW Altamira, 650 m (see Altamira)

Puente Tigre, 50 km SSE Maturín, 18 m (see Hato Mata de Bejuco)

Puerta Vieja, 14 km NE El Tocuyo, 616 m (see Caserio Boro)

Puerto Ayacucho (Pto. Ayacucho to Morganito, 70 km SSW Pto. Ayacucho), between 5°06'N-67°45'W and 5°40'N-67°38'W, 99-195 m (T. F. AMAZONAS). River plain, E bank of Río Orinoco; rolling, with scattered black rocks up to 90 m high and 120 m in diameter, more or less surrounded by accumulations of boulders and other fragments; soil sandy, mixed with gravel; drained by numerous streams up to 15 m wide; few lagoons or swamps. Savanna (S edge of Llanos) extending inland from river up to 15 km, merging abruptly into evergreen forest, with trees mostly 10-25 m high (in some areas 20-30 m high). Forest mostly rather open, except along streams, with occasional logs and boulders on forest floor, and more or less draped with vines. Savanna with closely spaced clumps of grass 0.5-1.5 m high; scattered low shrubs ("chaparro"—*Curatella americana*) and palms; irregular bands of low trees (3-9 m tall) around rocks and along watercourses. Numerous roads and small settlements; some fresh clearing and second growth in forest; regular burning in savanna. Holdridge classification: TROPICAL dry forest (bs-T) and TROPICAL humid forest (bh-T). Collectors: A. Tuttle, Inquilla, Stromeyer, and Peterson (2 specimens). SVP numbers: 11201, 13012, 30354-31800, 34438 (1,402 mammals, 22 birds, 23 reptiles, 3 amphibians). 29 Sep 1966, 10 May and 6 Sep-17 Oct 1967. SVP locality 35.

Puerto Cabello (15 km SW Pto. Cabello), 10°21'N-68°06'W, 50 m (CARABOBO). Dry, steep-sided valley with scrubby, second-growth deciduous forest. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP number 21372 (1 mammal, found dead on road). 29 Jan 1968. SVP locality 99-14.

Puerto Nuevo, 18 km SSW San Juan, Río Manapiare, 155 m (see San Juan, Río Manapiare)

Puerto Páez (from Pto. Páez to Río Cinaruco, 38 km NNW Pto. Páez), between 6°12'N-67°27'W and 6°33'N-67°31'W, 76 m (APURE). Town of Pto. Páez, nearby rock outcrop (Cerro de Murciélagos), and savanna to ferry crossing on Río Cinaruco, 38 km NNW Pto. Páez (on road to San Pablo and San Fernando). Seasonally flooded, low, gently rolling sandhills, covered with dense, 0.5-1 m high grass. High ground, probably never flooded, dry and sandy, with clumps of bunch grass 0.3-1.2 m apart. Sluggish streams, pools, and marshes in low ground between hills bordered by very lush cover of herbs, ferns, and grass (0.6-1.2 m high), scattered palms, patches of low forest (9-15 m high) almost lacking ground vegetation. Few human habitations. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 6117-6398, 6444-6511, 13011, 35751 (336 mammals, 13 birds, 2 reptiles, 1 fish). 11 Jan-1 Feb 1966. SVP locality 7.

Puerto Píritu (20 km E Pto. Píritu), 10°04'N-64°51'W, 27 m (ANZOÁTEGUI). Very arid, low coastal hills; scrubby deciduous forest with cactus and thorny shrubs and trees 10-15 m high. Holdridge classification: TROPICAL very dry forest (bms-T). Collector: Peterson. SVP number: 12461 (1 mammal, found dead on road). 14 Feb 1967. SVP locality 94-10.

Puerto Tuy, 7 km E Río Chico, 1 m (see Río Chico)

Pure, 16 km SSW Capatárida, 75 m (see Capatárida)

Quebrada Ávila, 3 km NE Caracas, 1,050-1,100 m (see Caracas)

Quebrada Cantarana, 11 km NE Icabarú, 750 m (see Icabarú)

Quebrada Chacaito, 3 km Caracas, 1,110-1,180 m (see Caracas)

Quebrada Espinoza, 19 km NE Icabarú, 700 m (see Icabarú)

Quebrada Seca, 26 km N Valera, 131 m (see Valera)

Quetepe, 16 km E Cumaná, 1-5 m (see Cumaná)

Rancho Grande (Estación Biológica), 13 km NW Maracay, 10°21'N-67°40'W, 1,050-1,100 m (ARAGUA). Relatively dry, steep, inland slopes near crest of Sierra de la Costa, overlooking basin of Lago de Valencia. Few streams. Collecting in moderately disturbed cloud and evergreen forest, with dense shrub and ground strata; around fruit trees and shrubs on station lawn; and in high grass and overgrown banana patch on abandoned farm. Holdridge classification: PREMONTANE very humid forest (bmh-P). Collectors: Peterson, Flanigan, Handley, and Young. SVP numbers: 2001-2113, 13005-13007, 13009-13010 (118 mammals). 5-11 Aug 1965, 22 Apr 1967. SVP locality 50.

Rancho Grande (nr.), 44 km NNE Paraguaipoa, 15-50 m (see Cojoro)

Raya, 32 km S Pto. Ayacucho, 135 m (see Puerto Ayacucho)

Riecito, 30 km S Mirimire, 10°54'N-68°46'W, 300 m (FALCÓN). Low mountains bordering lower course of Río Tocuyo. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP numbers: 24821-24999, 35479-35670 (371 mammals, purchased). 6-8 Sep 1968. SVP locality 79-16.

Río Chico (to 10 km from town center), 10° 19'N-65°58'W, 1 m (MIRANDA). Wide, nearly level coastal plain, with sandy ocean beach backed by 5 km wide belt of swampy pockets between former beach lines; backed further inland by 5-10 km wide zone of arid thorn forest, much disturbed by settlement, agriculture, and roads; merging further inland rather abruptly into extensive, humid evergreen forest. Collecting on ocean beach; in flooded pastures and thickets of coconut palms and scrubby trees on causeways across marshes, swamps, and lagoons between uplands and beach; in thorn forest, with scattered large, spreading trees, palms, and thick, low shrubs, blanketed by thorny vines; in citrus, guava, and banana orchards; in lawns and gardens with palm-lined drives, fruit trees, large, low, spreading, flowering trees, and chicken coops, surrounded by thorn forest; in extensive high (2 m) grass surrounded by pasture, forest, and bananas; and in disturbed evergreen forest with scattered trees 12-15 m high, continuous subcanopy of bananas, cacao, etc., 5-8 m high, numerous vines, and sparse ground cover of grass and ferns. Holdridge classification: TROPICAL dry forest (bs-T) and TROPICAL humid forest (bh-T). Collectors: Peterson, D. Peacock, and R. Peacock. SVP numbers: 10658-11199, 11400-11712, 35750 (822 mammals, 5 birds, 17 reptiles, 5 amphibians, 7 other). 22 Oct-21 Nov 1966. SVP locality 65.

Río Cinaruco, 38 km NNW Pto. Páez, 76 m (see Puerto Páez)

Río Cinaruco, 46 km NE Pto. Páez, 76 m (see Hato Cariben)

Río Cinaruco, 48 km NW Pto. Páez, 6°31'N-67°46'W, 76 m (APURE). Llanos near Río Cinaruco. Upland savanna slightly rolling, covered with grass about 0.5 m high. Forest band (6-125 m wide) on banks of river and bordering lagoons, low (5-15 m) and dense, with many spiny palms and thorny vines; ground covered with dry leaves and twigs. Collecting in savannas and forest on both banks of river. Holdridge classification: TROPICAL dry forest (bs-T). Collector: M. Tuttle. SVP numbers: 6399-6409 (9 mammals, 2 birds). 13-18 Jan 1966. SVP locality 8.

Río Cinaruco, 65 km NW Pto. Páez, 6°33'N-67°55'W, 76 m (APURE). Llanos near Río Cinaruco. Savanna with grass about 0.5 m high and scattered patches of dry forest to 1 km in diameter; small streams bordered by palms and other trees, with lush undergrowth (0.5-1 m high) of herbs, grass, ferns, and moss; evergreen forest on wet ground along river with *Heliconia* to 7.5 m high forming dense thickets and with palms to 30 m high, extending above broadleaf canopy. Collecting in gardens around Indian settlement and in savannas and forest in banks of river. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 6410-6443 (26 mammals, 6 birds, 2 reptiles). 19-21 Jan 1966. SVP locality 9.

Río Cuchivero, nr. Caicara to 38 km SE Caicara, 50-200 m (see Hato La Florida)

Río Cunucunuma, 150 m (see Acanaña and Belén)

Río Danta, 67 km SSE El Dorado, 150 m (see El Manaco)

Río Manaviche, 15 to 20 km E Boca Mavaca, 138 m (see Boca Mavaca)

Río Mavaca, 108 km SSE Esmeralda, 2°15'N-65°17'W (to 2°05'N-65°18'W and 2°20'N-65°15'W), 140 m (T. F. AMAZONAS). At edge of Orinoco Plain, where Río Mavaca passes into region of hills and low mountains (300-450 m). Río Mavaca, a white water stream, here has many black water tributaries, to 10 m wide. River plain flooded in rainy season, leaving numerous moist areas and occasional permanent lagoons in dry season. Flood plain forest evergreen, 25-35 m high, largely undisturbed except for Indian trails, and because of flooding, largely lacking ground vegetation (but some flat areas had dense stands of low palms). Hill forest 15-30 m high, with numerous palms and abundant undergrowth. Hollow trees unusually abundant. Holdridge classification: TROPICAL humid forest (bh-T). Collectors: M. Tuttle and Harder. SVP numbers: 17381-17395, 17397-17401, 17409-17410, 17413-17593, 17595-18136 (631 mammals, 41 birds, 9 reptiles, 64 amphibians). 21 Mar-16 Apr 1967. SVP locality 29.

Río Montalbán, 0.2 km W Montalbán, 598 m (see Montalbán)

Río Motatán, 23 km NNW Valera, 90 m (see Valera)

Río Negro, 8 km W Machiques, 10°03'N-72°-37'W, 250 m (ZULIA). Hilly western edge of plain of Lago de Maracaibo. Dry, shrubby pastureland. Holdridge classification: TROPICAL humid forest (bh-T). Collector: Peterson. SVP numbers: 22051, 22053 (2 mammals, found dead on road). 14 Apr 1968. SVP locality 81-26.

Río Orinoco (see Boca Mavaca, Esmeralda, Puerto Ayacucho, Puerto Páez, and Tamatama)

Río Orituco, 14 km SE Calabozo, 100 m (see Estación Biológica de los Llanos)

Río Orituco, 10 km N Altagracia, 470 m (see Guatopo)

Río Salado, 10 km NE Güiria, 90 m (see Ensenada Cauranta)

Río Santo Domingo, 1 to 2 km SW and E Altamira, 600-619 m (see Altamira)

Río Socopito, 80 km NW Carora, 10°30'N-70°-44'W, 470-480 m (FALCÓN). Valley of Río Socopito, 6 km NE Cerro Socopo summit. Remnant evergreen forest on valley floor had open or closed tree canopy at 30 m; subcanopy, occasionally closed, at 10 m; very dense ground cover of shrubs, grasses, and herbs; bromeliads and vines frequent. On hills above river, scrub thorn forest had continuous canopy at 10 m and scattered larger acacias and mimosas, and occasional cacti; irregular ground cover of grass and low herbs. Holdridge classification: TROPICAL dry forest (bs-T) and PREMONTANE humid forest (bh-P). Collectors: Brown and Matson. SVP numbers: 22900-23197 (294 mammals, 1 bird, 2 reptiles, 1 amphibian). 20-30 May 1968. SVP locality 82 (subloc. 18-24).

Río Supamo, 50 km SE El Manteco, 7°00'N-62°15'W, 350 m (BOLÍVAR). Forested upland plain. Collections from both banks of Río Supamo in mature evergreen forest, 20-35 m high, with abundant vines and epiphytes and scattered palms; largely undisturbed except for jeep trails and occasional small clearings with huts, gardens, and secondary scrub forest. Holdridge classification: PREMONTANE humid forest (bh-P). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 7326-7363, 7566-7567, 7594-7619, 7621-7709, 7714-7724, 7771, 7777-7784, 7793-7813, 7815-7818, 7824-7861 (209 mammals, 8 birds, 13 reptiles, 2 amphibians, 6 other). 30 Mar-4 May 1966. SVP locality 13.

Río Tigre, 50 km SSE Maturín, 18 m (see Hato Mata de Bejuco)

Río Tiquire, 27 km ENE Maripa, 7°27'N-64°55'W, 100 m (BOLÍVAR). Forest bordering stream in extensive savanna. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: Peterson, D. Peacock, and R. Peacock. SVP number: 12740 (1 mammal, purchased). 13 Apr 1967. SVP locality 87.

Río Tocuyo, 10 km N El Tocuyo, 518 m (see Caserio Boro)

Río Ventuari, 172 km ESE Pto. Ayacucho, 155 m (see San Juan, Río Manapiare)

Río Yaracuy, 10 km NW Urama, 25 m (see Urama)

Rueda, 18 km S Pto. Ayacucho, 145 m (see Puerto Ayacucho)

Sabana Aguirre, 5 km SE Montalbán, 562 m (see Montalbán)

Sabana de Mendoza, 20 to 30 km WNW and NW Valera, 90-134 m (see Valera)

Salamanca, 3 km NNE La Asunción, 37-38 m (see Isla Margarita)

Salvajito, 15 km SSE Pto. Ayacucho, 174 m (see Puerto Ayacucho)

Samariapo, 55 km SSW Pto. Ayacucho, 119 m (see Puerto Ayacucho)

San Agustín, 2 to 10 km NW, W, and SW Caripe, 10°12'N-63°32'W, 854-1,690 m (MONAGAS and SUCRE). Upper reaches of Río Caripe Valley and gentle to moderate E and SE slopes and steep NE slopes of Cerro Negro. Summit with páramolike vegetation and stunted trees; lower elevations with moist evergreen forest and small areas of savanna. Moderate slopes and valleys almost entirely cultivated (coffee, oranges, lemons, bananas, cabbages, beans, etc.), with remnant forest providing shade canopy. Collecting in: 1) Rock outcrops and ledges, with dense, coarse grass (1 m high); prostrate thorny vines, and scattered ferns and shrubs (to 2 m high) on high, steep, exposed slope. 2) Scrubby, cutover evergreen forest remnant along small, swift-flowing stream through vegetable fields and orchards; scattered trees 20-30 m high; dense, vine-covered shrubs (4-6 m); and grass and herbs 1-2 m. 3) Moist evergreen forest with trees 20-25 m high, laden with orchids and bromeliads and festooned with lichens; understory of coffee and bananas; ground clear or with cover of vines, ferns, and herbs up to 1.5 m; tree-bases and boulders moss-covered; soil black and with heavy humus. 4) Montane savanna, with dense grass to 1 m; herbs and small woody plants; and shrubs (2 m). 5) Moist limestone caverns. Holdridge classification: PREMONTANE humid forest (bh-P). Collectors: Peterson, D. Peacock, R. Peacock, and Tipton. SVP numbers: 13644-14298 (632 mammals, 10 birds, 3 reptiles, 1 amphibian, 9 other). 22 Jun-16 Jul 1967. SVP locality 72.

San Andrés, 16 km SSE Caracas, 10°22'N-66°50'W, 950-1,144 m (MIRANDA). Upper part of steep N slope of Quebrada Suapire. Trapping and netting in cloud forest with many ferns and vines and much bamboo; and in coffee plantation with canopy trees 30 m high, shrub stratum cleared for coffee, and ground cover of low grass and forbs. Holdridge classification: PREMONTANE humid forest (bh-P). Collectors: Peterson, Naranjo, D. Peacock, and R. Peacock. SVP numbers: 3746-3771, 4598-4650, 4843-4870 (106 mammals, 1 amphibian). 26-30 Dec 1965, 10-12 Aug 1966. SVP locality 55.

San Eusebio, 12 km SE La Azulita, 1,990-2,190 m (see La Carbonera)

San Fernando, 16 km SE Cumaná, 10°21'N-64°06'W, 150-300 m (SUCRE). Lower portion of Río Manzanares in foothills. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP numbers: 24345, 24389, 24417-24472, 24480-24545 (124 mammals, purchased). 15-18 Apr and 17-26 May 1968. SVP locality 79-15.

San Fernando de Apure, 7°53'N-67°26'W, 25 m (APURE). Llanos, with seasonally flooded, scrubby, second-growth forest near river, grassy savanna beyond. Collections from attic of house at Apure Airport. Holdridge classification: TROPICAL dry forest (bs-T). Collector: M. Tuttle. SVP numbers: 6732-6744, 6754 (14 mammals). 27 Feb 1966. SVP locality 11.

San José, 10 km NE El Tocuyo, 580 m (see Caserio Boro)

San José de Tiznados, 52 km NNW Calabozo, 9°23'N-67°34'W, 150 m (GUÁRICO). Llanos. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP numbers: 24335-24344, 24346-24388, 24390-24416, 24479 (81 mammals, purchased). 15 Apr and 22-28 May 1968. SVP locality 79-13.

San Juan de los Cayos (13 km SE San Juan de los Cayos, nr. Boca de Tocuyo), 11°04'N-68°21'W, 1 m (FALCÓN). Dry, sandy coastal plain with low thorn forest. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP number: 14808 (1 mammal, found dead on road). 9 Nov 1967. SVP locality 99-11.

San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, 5°18'N-66°13'W (to 5°28'N-66°13'W and 5°02'N-66°13'W, within 30 km of San Juan), 155 m (T. F. AMAZONAS). Part of the Ventuari Basin, an extensive plain, nearly surrounded by high, forested mountains. Basin with many streams and lagoons, and subject to extensive seasonal flooding (about 95 percent flooded near San Juan at time of collections). Basin with continuous evergreen forest and isolated savannas, and scattered palms and bands of forest along streams. Many dead (often rotten or hollow) snags standing in lagoons serving as bat roosts. Most of forest undistrubed, except where large Indian population had made small clearings for settlements and gardens. Holdridge classification: TROPICAL humid forest (bh-T). Collectors: M. Tuttle and Harder. SVP numbers: 19647-19999, 25001-26254, 26264-26931, 26933-27895, 27915-28383, 28397-29006, 29008-30353, 35764 (5,632 mammals, 21 birds, 8 reptiles, 2 other). 25 Jun-3 Aug 1967. SVP locality 34.

San Pablo (nr.), 13 km ESE Mirimire, 270 m (see Mirimire)

San Pedro, 2 km SE Altamira, 600 m (see Altamira)

San Rafael de Atamaica, 42 km SSE San Fernando de Apure, 7°31'N-67°24'W, 100 m (APURE). Llanos. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP numbers: 21529-21569, 21670, 21673 (43 mammals, purchased). 21 Jan 1968. SVP locality 79-11.

San Rafael de Mara (7 km NW San Rafael de Mara, nr. ferry at Río Limón), 10°59'N-71°47'W, 1 m (ZULIA). Arid coastal plain. Holdridge classification: TROPICAL very dry forest (bms-T). Collector: Peterson. SVP number: 24027 (1 mammal, found dead on road). 2 Jul 1968. SVP locality 88.

Sanjón, 1 km E Montalbán, 598 m (see Montalbán)

Santa Ana, 1.4 km E Montalbán, 598 m (see Montalbán)

Santa Apolonia (nr.), 48 to 52 km WNW Valera, 28-29 m (see La Ceiba)

Santa Clara, 18 km WNW Capatárida, 40 m (see Capatárida)

Santa Crucita, 21 km NW Altagracia, 500 m (see Guatopo)

Santa Lucía de Surukún, 45 km NE Icabarú, 851 m (see Icabarú)

Santa Rosa (La Hechicera), 1 to 2 km N Mérida, 8°37'N-71°09'W, 1,860-2,050 m (MÉRIDA). Agricultural experiment station on floor of Andean valley. Collecting in: 1) Remnant cloud forest, burned about four years previously; moist, with many boulders and thick humus; trees to 20 m high, forming closed canopy, but rather open beneath, with scattered shrubs, numerous ferns and herbs, and moss and lichens covering rocks, logs, and roots and trunks of trees. 2) Stream bank second-growth scrub in cultivated area; trees to 6 m, shrubs 3 m, many herbs, ferns, and vines. 3) Weeds up to 2 m high bordering small stream flowing among houses and through cane fields and banana patch. Holdridge classification: LOWER MONTANE humid forest (bh-MB). Collector: Peterson. SVP numbers: 4545-4597 (52 mammals, 1 bird). 14-31 May 1966. SVP locality 60.

Santa Rosa, 6 km SSW Capatárida, 50 m (see Capatárida)

Santa Rosa (nr.), 17 km ENE Mirimire, 75 m (see Mirimire)

Selvas de San Camilo (see Nulita)

Sividigua, 6 km SE Capatárida, 50 m (see Capatárida)

Sotillo, 21 km E Cumaná, 30-40 m (see Cumaná)

Tabay (Parque Nacional de la Sierra Nevada, 4 to 9 km E and SE and 1 km SW Tabay), 8°36'N-71°01'W, 1,530 and 2,077-3,830 m (MÉRIDA). Large Andean valleys, heading near Pico Humboldt. Valley floors flat in upper reaches and containing glacial lakes; walls steep and very high; remnant glaciers persisting at valley heads. Soil clay-loam, deep at lower elevations, in pockets between boulders at middle elevations, and often absent at higher elevations; boulders, talus, and exposed bedrock commonplace. Streams clear, rapid flowing, boulder-strewn. Flora varied from closed canopy cloud forest at lower elevations to open alpine páramo at higher elevations. Mature cloud forest, penetrable only with machete, with trees 18-24 m high; tree ferns and shrubs 3-15 m high formed a lower canopy; vines, lichens, and other epiphytes draped trees and shrubs; moss and scattered herbs, and, in particularly moist areas, liverworts, usually covered ground, boulders, and logs; slender, vinelike bamboo was scattered throughout and formed dense thickets in openings. Forest-páramo ecotone dominated by moss and lichen covered boulders; low (4 m) twisted trees; low (0.5 m) spreading shrubs; grass and herbs (to 1 m). Páramo had bare rock outcrops, boulder fields, bunch grass (to 1.5 m), scattered "frailejones," shrubs (to 3 m), and moss. Access by a single foot path; no hunting or agriculture; no clearing, but part of forest-páramo ecotone had burned two years before collections were made. Holdridge classification: LOWER MONTANE humid forest (bh-MB), MONTANE rain forest (bp-M), and SUBALPINE páramo (p-SA). Collectors: Peterson, Parrish, and Tipton. SVP numbers: 4008-4015, 4017-4356, 4359-4360, 4362-4465 (394 mammals, 53 birds, 2 amphibians, 5 other). 8-24 Mar and 4-17 Apr 1966. SVP locality 58.

Tacarigua de La Laguna, 10 km ESE Río Chico, 1 m (see Río Chico)

Tácata, 35 km SW Caracas, 10°13'N-67°00'W, 366 m (MIRANDA). Dry valley, with farms and second growth deciduous forest. Holdridge classification: TROPICAL dry forest (bs-T). Collector: Peterson. SVP number: 20808 (1 mammal, purchased). 17 Dec 1967. SVP locality 99-18.

Tamanaco, 4 km NE San Juan, Río Manapiare, 155 m (see San Juan, Río Manapiare)

Tamatama (Río Orinoco), 2 km above mouth of Brazo Casiquiare, 3°10'N-65°49'W, 135 m (T. F. AMAZONAS). Undulating plain of Río Orinoco, with hills up to 60 m. High evergreen forest, more or less disturbed near river. Most collecting in thatched roofed buildings, yards, and gardens of New Tribes Mission. Holdridge classification: TROPICAL humid forest (bh-T). Collectors: M. Tuttle and Harder. SVP numbers: 17411, 18137-18586, 18636-18968, 18995-18997, 19003-19141, 19156-19225, 19230-19259, 19434-19435, 19642-19644, 28384-28396 (940 mammals, 73 birds, 26 reptiles, 5 amphibians). Mar and 20 Apr-20 Jun 1967. SVP locality 30.

Teatas de Mariá Guevara, 31 km W Porlamar, 10 m (see Isla Margarita)

Timotes (Mts. W Timotes), 2,000-2,500 m (see Paramito)

Tortuguira, 7 km SW Porlamar, 2 m (see Isla Margarita)

Turgua (nr.), 16 km SSE Caracas, 1,144 m (see San Andrés)

Uaiparú, 19 km NE Icabarú, 658 m (see Icabarú)

Upata (5 km SSW Upata), 7°59'N-62°25'W, 300 m (BOLÍVAR). Hills covered with low deciduous forest and grassland, on road from Upata to El Manteco. Holdridge classification: TROPICAL dry forest (bs-T). Collectors: M. Tuttle and A. Tuttle. SVP number: 7862 (1 mammal, found dead on road). 28 Apr 1966. SVP locality 17.

Upata (25 km S Upata), 7°48'N-62°26'W, 300 m (BOLÍVAR). Hilly evergreen forest, on road from Upata to El Manteco. Holdridge classification: PREMONTANE humid forest (bh-P). Collectors: M. Tuttle and A. Tuttle. SVP number: 7819 (1 mammal, found dead on road). 14 Apr 1966. SVP locality 15.

Urama (2.5 to 24 km NW, N, and NE Urama), 10°37'N-68°24'W, 10°32'N-68°23'W, 10°29'N-68°19'W, 25-60 m (CARABOBO, FALCÓN, and YARACUY). Cattle ranch on flat to hilly plain between Salado, Yaracuy, and Aroa rivers, inland about 15 km from coast. Numerous permanent and seasonal streams; some small ponds; and a few extensive, rather open swamps. Much clearing for pasture; grass varying from short on dry hills to 1.5-2.5 m high; dense patches of wild cane and *Heliconia* on streambanks and in other damp places; occasional banana plantations. Small patches of thorny deciduous forest between Salado and Yaracuy rivers; extensive stands of mature evergreen forest N Río Yaracuy. Holdridge classification: TROPICAL dry forest (bs-T) and TROPICAL humid forest (bh-T). Collectors: M. Tuttle and A. Tuttle. SVP numbers: 1579-1826, 1828-1999, 5000-5479, 6745-6753, 6755-7194, 7196-7325 (1,272 mammals, 39 birds, 56 reptiles, 112 amphibians). 12 Oct-16 Nov 1965, 4-25 Mar 1966. SVP locality 5.

Valera (12 to 30 km N to NW Valera), 9°32'N-70°40'W (to 9°31'N-70°35'W, 9°25'N-70°46'-W, and 9°21'N-70°42'W), 90-930 m (TRUJILLO). Lower Río Motatán Basin. Alluvial plain with scattered low hills, bordered by low mountains; mostly sandy or sandy-clay soils; occasional clay escarpments up to 30 m high. Lower part of area dry (smaller stream courses seasonal), mostly cultivated and irrigated; higher part more humid, with continuous secondary forest and small isolated tracts of primary forest. Collecting in second-growth evergreen forest with trees 17-25 m high and thorny shrubs and vines; second-growth deciduous forest, mostly rather open, with trees to 25 m, vines, grass, and herbaceous plants, and often cactus and thorny shrubs; dense brush 5 m high, with clumps of high grass and scattered trees 10-18 m high; fallow fields overgrown with grass to 2.5 m high and scattered thorny shrubs 3-4 m high; high grass and forbs at edge of flooded rice fields; pasture, with clumps of grass 1 m high and scattered trees; swamp with damp ground and small streams, dense *Heliconia* 4-5 m high, scattered palms and trees to 25 m, vines, and thickets of bamboo. Holdridge classification: TROPICAL dry forest (bs-T) and TROPICAL humid forest (bh-T). Collectors: Peterson, Flanigan, Handley, Taylor, and Young. SVP numbers: 2114-2546, 2552-3549, 3551, 3634, 3702, 3704-3707, 3812 (1,320 mammals, 65 birds, 42 reptiles, 11 amphibians, 1 other). 15 Aug-25 Oct, 1 and 6 Nov, and 3-13 Dec 1965 and 17 Jan 1966. SVP locality 51.

Vetania, 46 km NE Icabarú, 800 m (see Icabarú)

Yabuquiva, 25 km SW Pueblo Nuevo, 13 m (see Península de Paraguaná)

Zamurito, 13 km SSE Capatárida, 30-60 m (see Capatárida)

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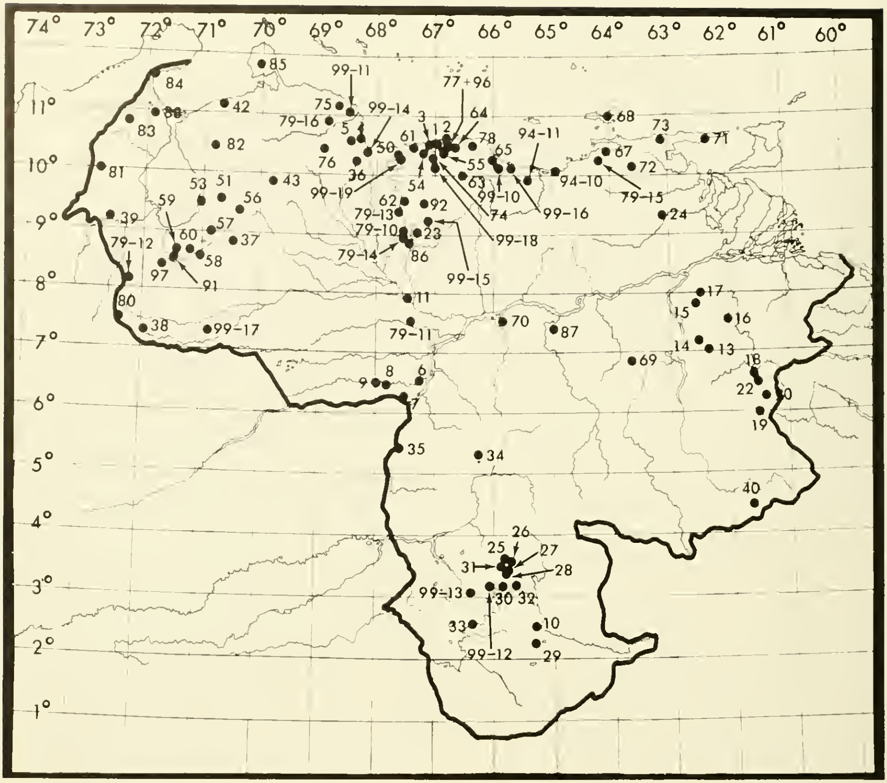

Fig. 1 Map of Venezuela showing major SVP collecting localities.

01	Los Venados, 4 km NNW Caracas, Dto. Federal
02	Pico Ávila (= Hotel Humboldt and Boca de Tigre), 5 km NNE to 6 km NNW Caracas, Dto. Federal and Miranda
03	Boca de Tigre Valley, 5 km NW Caracas, Dto. Federal
04	Boca de Yaracuy, 28 km WNW Pto. Cabello, Falcón
05	Urama (2.5 to 24 km NW, N, and NE), Carabobo, Falcón, and Yaracuy
06	Hato Cariben, nr. Santa María, 32 to 46 km NE Pto. Páez, Apure
07	Puerto Páez (to Río Cinaruco, 38 km NNW), Apure
08	Río Cinaruco, 48 km NW Pto. Páez, Apure
09	Río Cinaruco, 65 km NW Pto. Páez, Apure
10	Boca Mavaca, 84 km SSE Esmeralda, T. F. Amazonas
11	San Fernando, Apure
13	Río Supamo, 50 km SE El Manteco, Bolívar
14	Los Patos, 25 km SE El Manteco, Bolívar
15	Upata (25 km S), Bolívar
16	Guasipati (5 km NNW), Bolívar
17	Upata (5 km SSW), Bolívar
18	El Dorado (15 km SE), Bolívar
19	Km 125, 68 to 85 km SSE El Dorado, Bolívar
20	El Manaco, 56 to 68 km SE El Dorado, Bolívar
22	Km 33, 28 km SE El Dorado, Bolívar
23	Hato Los Leones (Caño Agua Fría), 23 km NE Calabozo, Guárico
24	Hato Mata de Bejuco, 55 km SSE Maturín, Monagas
25	Belén, Río Cunucunuma, 56 km NNW Esmeralda, T. F. Amazonas
26	Caño Culebra, Cerro Duida, 50 km NNW Esmeralda, T. F. Amazonas
27	Cabecera del Caño Culebra, Cerro Duida, 40 km NNW Esmeralda, T. F. Amazonas
28	Cabecera del Caño Negro, Cerro Duida, 32 km NW Esmeralda, T. F. Amazonas
29	Río Mavaca, 108 km SSE Esmeralda, T. F. Amazonas

30	Tamatama, Río Orinoco, 2 km above Boca de Casiquiare, T. F. Amazonas
31	Acanaña, Río Cunucunuma, 48 km NW Esmeralda, T. F. Amazonas
32	Esmeralda (to 20 km SE and 14 km W), Río Orinoco, T. F. Amazonas
33	Capibara, Brazo Casiquiare, 106 km SW Esmeralda, T. F. Amazonas
34	San Juan, Río Manapiare, 163 km ESE Pto. Ayacucho, T. F. Amazonas
35	Puerto Ayacucho (to 70 km SSW), T. F. Amazonas
36	Montalbán (within 14 km of town center), Carabobo
37	Altamira, Barinas
38	Nulita, Selvas do San Camilo, 29 km SSW Sto. Domingo, Apure
39	El Rosario, 39 to 65 km WNW Encontrados, Zulia
40	Icabarú (to 56 km NE), Bolívar
42	Capatárida (within 31 km of town center), Falcón
43	Caserio Boro, 10 to 47 km N and NE El Tocuyo, LARA
50	Rancho Grande (Est. Biol.), 13 km NW Maracay, Aragua
51	Valera (12 to 30 km N to NW), Trujillo
53	La Ceiba, 46 to 53 km WNW Valera, Trujillo
54	Alto Ño León, 31 to 36 km WSW Caracas, Dto. Federal and Miranda
55	San Andrés, 16 km SSE Caracas, Miranda
56	Hda. Misisí, 13 to 15 km E Trujillo, Trujillo
57	Paramito, 3 to 4 km W Timotes, Mérida
58	Tabay (4 to 9 km ESE and 1 km SW), Parq. Nac. Sierra Nevada, Mérida
59	La Carbonera, 6 to 12 km SE La Azulita, Mérida
60	Santa Rosa, 1 to 2 km N Mérida, Mérida
61	Hda. Carapiche, nr. El Limón, 48 km W Caracas, Dto. Federal
62	Hato Las Palmitas, 35 km SSW San Juan de los Morros, Guárico
63	Guatopo (Parq. Nac.), 10 to 35 km NE, N, and NW Altagracia, Guárico and Miranda
64	Curupao, 5 km NNW Guarenas, Miranda
65	Río Chico (to 10 km from town center), Miranda
67	Cumaná (to 24 km E), Sucre
68	Isla Margarita, Nueva Esparta
69	Hato San José, 20 to 37 km NW, W, and SW La Paragua, Bolívar
70	Hato La Florida, 38 to 63 km SE and SSE Caicara, Bolívar
71	Ensenada Cauranta, 9 to 12 km NE Güiria, Sucre
72	San Agustín, 2 to 10 km to W and SW Caripe, Monagas and Sucre
73	Manacal, 26 km ESE Carúpano, Sucre
74	I.V.I.C., 15 km SW Caracas, Dto. Federal and Miranda
75	Mirimire (to 20 km NNE to ESE), Falcón
76	Minas de Aroa, 19 to 30 km NW San Felipe, Yaracuy
77	El Encantado, 13 to 15 km SE Caracas, Miranda
78	Birongo, Miranda
79–10	Embalse de Guárico, 10 km N Calabozo, Guárico
79–11	San Rafael de Atamaica, 42 km SSE San Fernando, Apure
79–12	Las Mesas, 17 km NE San Juan de Colón, Táchira
79–13	San José de Tiznados, 52 km NNW Calabozo, Guárico
79–14	Calabozo, Guárico
79–15	San Fernando, 16 km SE Cumaná, Sucre
79–16	Riecito, 30 km S Mirimire, Falcón
80	Buena Vista, nr. Páramo de Tamá, 41 km SW San Cristóbal, Táchira
81–(10–18)	Kasmera, 21 km SW Machiques, Zulia
81–(19–25)	Novito, 19 km WSW Machiques, Zulia
81–26	Río Negro, 8 km W Machiques, Zulia
82–(10–17)	Cerro Socopo, 84 km NW Carora, Falcón
82–(18–24)	Río Socopito, 80 km NW Carora, Falcón
83	Cerro Azul, 33 to 40 km NW La Paz, Zulia
84	Cojoro, 30 to 40 km NNE Paraguaipoa, Guajira and Zulia
85	Península de Paraguaná, 6 to 25 km S, SW, and N Pueblo Nuevo, Falcón
86	Est. Biol. de los Llanos, 9 to 14 km SE Calabozo, Guárico
87	Río Tiquire, 27 km ENE Maripa, Bolívar
88	San Rafael de Mara (7 km NW, nr. Río Limón), Zulia
91	Lagunillas (1 km NE), Mérida
92	Hda. Los Mamones, 16 km NW Barbacoas, Guárico
94–10	Pto. Píritu (20 km E), Anzoátegui
94–11	Clarines (14 km W), Anzoátegui
96	Caracas, Dto. Federal and Miranda
97	Mesa Bolívar, 22 km SSE El Vigía Mérida
99–10	El Guapo (13 km E), Miranda
99–11	San Juan de los Cayos (13 km SE, nr. Boca de Tocuyo), Falcón
99–12	Boca de Río Cunucunuma, 49 km W Esmeralda, T. F. Amazonas
99–13	Caño Cariche, Río Orinoco, 92 km W Esmeralda, T. F. Amazonas
99-14	Pto. Cabello (15 km SW), Carabobo
99–15	La Encrucijada, 18 km S El Sombrero, Guárico
99–16	Cúpira, 30 km E El Guapo, Miranda
99–17	Guasdualito (10 km WNW, nr. Río Sanare), Apure
99–18	Tácata, 35 km SW Caracas, Miranda
99–19	El Limón, 4 km NW Maracay, Aragua

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